total earth care

Flora Fauna Impact Assessment

McKillop Park Boardwalk, Freshwater NSW 2096

September 2022

total earth care

McKillop Park Boardwalk, Freshwater
NSW 2096

Flora Fauna Impact Assessment

September 2022

Quality Control	© Total Earth Care Pty Ltd 2021
Prepared for	Northern Beaches Council
Care of	Eliza Halsey
Site location	McKillop Park, corner of Evans Street and Lumsdaine Drive Freshwater, NSW, 2096
Job number	J13316

Revision no.	Prepared by	Review by	Revision date	Description
Draft v1	A Willows & L Andrade	P Zadorojnaya	2/09/2022	Draft Flora Fauna Impact Assessment
Final	A Willows	Eliza Halsey	20/09/2022	Final Flora Fauna Impact Assessment with client comments and feedback

5/1 Vuko Place
Warriewood NSW 2102
Telephone 02 9913 1432
Facsimile 02 9913 1434
admin@totalearthcare.com.au www.totalearthcare.com.au consulting@totalearthcare.com.au

Table of Contents

Table of Figures

Table of Tables

1.1 Acronyms and Abbreviations

Term	Definition
asl	Above sea level
APZ	Asset Protection Zone
BC Act	NSW *Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
Biosecurity Act	*Biosecurity Act 2015*
BOS	Biodiversity Offsets Scheme
BV Map	Biodiversity Values Map
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
DAFF	Department of Agriculture Fisheries and Forestry
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPE	NSW Department of Planning and Environment (formerly DPE)
DPIE	NSW Department of Planning, Industry and Environment (now DPE)
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPI	Environmental Planning Instrument
FFIA	Flora and Fauna Impact Assessment
ha	hectare
WDCP 2011	Warringah Development Control Plan 2011
WLEP 2011	Warringah Local Environmental Plan 2012
km	kilometre
KTP	Key Threatening Processes
LEP	Local Environmental Plan
LGA	Local Government Area
m	metre
MNES	Matters of National Environmental Significance
PCT	Plant Community Type
PMS	Protected Matters Search
TEC	Threatened Ecological Community
WoNS	Weeds of National Significance

1. Introduction

1.2 Background

Total Earth Care has been commissioned by the Northern Beaches Council to prepare this Flora and Fauna Impact Assessment (FFIA) for the proposed development of an elevated public boardwalk (The proposal). The proposal is a part of the Zone 1 Freshwater Headland & Beach Boardwalks plan (Northern Beaches Council 2019) located at McKillop Park within the suburb of Freshwater. Further details of the proposal are outlined in the Proposed Development section of this FFIA.

1.3 The Site

The proposal is located within a registered lot boundary identified from the address '145 Evans Street, Freshwater, 2096 (Lot 7108, DP1074767). It is noted that this lot boundary was utilised to inform SEPP results and local planning provisions. The 'site' consists of the area assessed under the scope of the proposal and is comprised of the area of land likely to be directly or indirectly impacted by the development. The 'study area' comprises the site in addition to the surrounding land that may be potentially indirectly affected by or affect the development. The 'locality' encompasses a larger area that includes more distant environmental features (i.e. receiving air and water, mobile native biodiversity). Details of the site are provided in Table 1-1 and shown in Figure 1-1.

Table 1-1. Site details

Feature	Description
Registered lot address	145 Evans Street, Freshwater, NSW, 2096
Site address	McKillop Park – corner of Evans Street and Lumsdaine Drive
Property identifier (Lot and DP)	Lot 7108, DP1074767
Local Government Area (LGA)	Northern Beaches Council
Zoning	RE1 – Public Recreation

Figure 1-1. Proposed Boardwalk site.

1.4 Proposed Development

The proposal includes the construction of an elevated boardwalk (with associated viewing platforms) and is expected to include the following scope of works:

Pre-construction:

- Site preparation including the clearing of vegetation and
- Installation of ancillary facilities and stockpile areas

Construction:

- Boardwalk installation including minor excavation works, rock grinding and drilling for the installation of footings and substrate compaction

Post-construction:

- Remediation of disturbed areas and
- Removal of ancillary facilities and stockpile areas.

1.5 Scope and Aims

The aims of this FFIA are to:

- Review the statutory approval framework including relevant environmental planning instruments and consent authority requirements
- Describe the existing flora and fauna within the site based on database searches, review of existing reports and site surveys
- Confirm the presence, or likely occurrence, of threatened species, populations and ecological communities (and their habitats), as listed under Commonwealth and State legislation
- Assess the potential direct and indirect impacts on flora and fauna, including threatened species, populations or endangered ecological communities or their habitats
- Prepare any relevant Assessments of Significance (5-part Tests) for threatened species, populations or ecological communities which are likely to be present at the site
- Provide recommendations and site-specific management measures to avoid and minimise impacts to flora and fauna

2 Legislation and Planning Instruments

2.1 Commonwealth Legislation

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places which are considered Matters of National Environmental Significance (MNES). Under the EPBC Act, approval is required for actions that have, will have, or are likely to have a significant impact on MNES.

Three species listed as threatened under the EPBC Act have a medium or high likelihood of occurrence on site. Assessments of significant impact criteria under the EPBC Act have been performed (Appendix I. Assessments of Significance) and found the proposal is unlikely to significantly impact these species. As such, no referral to the Australian Government Minister for the Environment (the Minister) is required.

2.2 NSW Legislation

2.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes the system of environmental planning and assessment in NSW. This proposal is subject to the environmental impact assessment and planning approval requirements of Division 5.1 of the EP&A Act. Division 5.1 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities which do not require development consent under Division 4.1 of the EP&A Act.

In accordance with Section 5.5 of the EP&A Act, The Northern Beaches Council, as both the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposal. Clause 228 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) defines the factors which must be considered when determining if an activity assessed under Division 5.1 of the EP&A Act would have a significant impact on the environment. This FFIA gives input into the environmental impact assessment process by providing assessment specific to matters of biodiversity.

2.2.2 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) seeks to conserve biological diversity and promote ecologically sustainable development, to prevent extinction and promote recovery of threatened species, populations and ecological communities and to protect areas of outstanding biodiversity value.

Eight species listed as threatened under the BC Act that have a high likelihood of occurrence. Assessments of Significance of these species and community have been prepared in accordance with Section 7.3 of the BC Act, provided in (Appendix I. Assessments of Significance). The assessments found that it is unlikely that the proposal will result in a significant impact on these species or communities.

The site does not contain Areas of Outstanding Biodiversity Value nor is the proposal set to affect the Biodiversity Values mapping or exceed the clearing threshold for a lot of its size.

2.2.3 Biosecurity Act 2015

The *Biosecurity Act 2015* identifies priority weeds and Pest Animal Species and assigns strategies for their containment, removal or management. Occupiers of land have responsibility under the Act for taking appropriate action for priority weeds on the land they occupy.

Twenty-five (25) weed species identified on site. Five species, *Lantana camara* (Lantana), *Ipomoea indica* (Morning Glory), *Ageratina riparia* (Mistflower), *Acetosa sagittate* (Rambling dock), and *Holcus lanatus* (Yorkshire Fog), are listed under the *Greater Sydney Regional Strategic Weed Management Plan 2017-2022* (LLS 2021). *Lantana camara* (Lantana) and *Asparagus aethiopicus* (Asparagus Fern) are listed Weeds of National Environmental Significance (WoNS). Appendix E. Weed Species listed as a Biosecurity Risk outlines the weed species, category of management and recommended treatment methods.

2.2.4 State Environmental Planning Policy (Biodiversity and Conservation) 2021

2.2.4.1 Chapter 2 – Vegetation in Non-rural Areas

Chapter 2 *Vegetation in non-rural areas* of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (Biodiversity and Conservation SEPP) aims to:

- protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and
- to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation.

This chapter of the Biodiversity and Conservation SEPP applies to the proposal as the site occurs within the Northern Beaches Local Government Area (LGA) and is zoned RE1: Public Recreation, as listed in the SEPP.

The proposal is justified under this SEPP as the removal of approximately 0.03ha of Plant Community Type 3812 across all strata layers and will result in a minor reduction in the biodiversity values across the study area. The area of this PCT required to be remove will not result in a reduction in the amenity of the site nor result in any significant removal of signification vegetative growth forms such as trees.

2.2.4.2 Chapter 6 – Bushland in Urban Areas

Chapter 6 *Bushland in urban areas* of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (Biodiversity and Conservation SEPP) specifically aims to:

- to protect the remnants of plant communities which were once characteristic of land now within an urban area,
- to retain bushland in parcels of a size and configuration which will enable the existing plant and animal communities to survive in the long term,
- to protect rare and endangered flora and fauna species,
- to protect habitats for native flora and fauna,
- to protect wildlife corridors and vegetation links with other nearby bushland,
- to protect bushland as a natural stabiliser of the soil surface,
- to protect bushland for its scenic values, and to retain the unique visual identity of the landscape,
- to protect significant geological features,
- to protect existing landforms, such as natural drainage lines, watercourses and foreshores,
- to protect archaeological relics,
- to protect the recreational potential of bushland,
- to protect the educational potential of bushland,
- to maintain bushland in locations which are readily accessible to the community, and
- to promote the management of bushland in a manner which protects and enhances the quality of the bushland and facilitates public enjoyment of the bushland compatible with its conservation.

This chapter of the Biodiversity and Conservation SEPP applies to the proposal as the site occurs within the Northern Beaches LGA (listed in Schedule 5 of the SEPP) and it is zoned RE1: Public Recreation therefore it is land reserved for public open spaces.

Section 6.6 *Public authorities* details that:

A public authority shall not disturb bushland for a purpose referred to in section 6.5(2) unless it has first had regard to the aims of this Chapter.

The proposal is justified under the Biodiversity and Conservation SEPP if the public authority considers the impacts and mitigation measures outlined in this FFIA.

2.2.5 State Environmental Planning Policy (Transport and Infrastructure) 2021

Division 12 Parks and other public reserves of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP 2021) specifically outlines:

- Any of the following development may be carried out by or on behalf of a council without consent on a public reserve under the control of or vested in the council
- *roads, pedestrian pathways, cycleways, single storey car parks, ticketing facilities, viewing platforms and pedestrian bridges and*
- *recreation areas and recreation facilities (outdoor), but not including grandstands*

The proposal is justified under the Transport and Infrastructure SEPP 2021 as it will involve the construction of a pedestrian pathway through the means of council providing a publicly accessible boardwalk.

2.2.6 State Environmental Planning Policy (Resilience and Hazards) 2021

2.2.6.1 Chapter 2 – Coastal Management

Chapter 2 *Coastal management* of the *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP 2021) aims to:

- promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the Coastal Management Act 2016, including the management objectives for each coastal management area, by
- *managing development in the coastal zone and protecting the environmental assets of the coast, and*
- *establishing a framework for land use planning to guide decision-making in the coastal zone*

The site is mapped under Division 3 Coastal environment area indicating that

Development consent must not be granted to development on land that is within the coastal environment area unless the consent authority has considered whether the proposed development is likely to cause an adverse impact on the following:

- *The integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment,*
- *coastal environmental values and natural coastal processes,*
- *the water quality of the marine estate (within the meaning of the* Marine Estate Management Act 2014*), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1,*
- *marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms,*
- *existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,*
- *Aboriginal cultural heritage, practices and places and*
- *the use of the surf zone.*

Development consent must not be granted to development on land to which this section applies unless the consent authority is satisfied that:

- *the development is designed, sited and will be managed to avoid an adverse impact referred to in subsection (1), or*
- *if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or*
- *if that impact cannot be minimised—the development will be managed to mitigate that impact.*

The proposal is justified under Division 3 of the Resilience and Hazards SEPP 2021 as it is unlikely to have an adverse effect on the coastal environment if the impacts and mitigation measures outlined in this FFIA are considered by the consent authority.

The site is also mapped under Division 4 Coastal use area (Figure 2-5) indicating that:

- Development consent must not be granted to development on land that is within the coastal use area unless the consent authority has considered whether the proposed development is likely to cause an adverse impact on the following
- *existing, safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,*
- *overshadowing, wind funnelling and the loss of views from public places to foreshores,*
- *the visual amenity and scenic qualities of the coast, including coastal headlands,*
- *Aboriginal cultural heritage, practices and places,*
- *cultural and built environment heritage, and*

and is satisfied that:

- *the development is designed, sited and will be managed to avoid an adverse impact referred to in paragraph (a), or*
- *if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or*
- *if that impact cannot be minimised—the development will be managed to mitigate that impact, and*
- *has taken into account the surrounding coastal and built environment, and the bulk, scale and size of the proposed development.*

The proposal is justified under Division 4 of the Resilience and Hazards SEPP 2021 as it is unlikely to have an adverse effect on the coastal environment if the impacts and mitigation measures outlined in this FFIA are considered by the consent authority.

2.3 Local Legislation

2.3.1 Warringah Local Environment Plan 2011

The Warringah Local Environment Plan 2011 (WLEP 2011) is the primary environmental planning instrument (EPI) for the site. In relation to this FFIA, the site and scope of works, the WLEP 2011 aims to:

- in relation to environmental quality, to
  - *protect, conserve and manage biodiversity and the natural environment, and*
  - *manage environmental constraints to development including acid sulfate soils, land slip risk, flood and tidal inundation, coastal erosion and biodiversity*

The proposal will result in the clearing of approximately 0.03ha of Plant Community Type 3812 across all strata layers and will result in a minor reduction in the biodiversity values across the study area. The impacts and mitigation measures outlined in the FFIA aim to work in alignment with the WLEP 2011 and if considered by the proponent will result in minimal impacts to ecology and the environment.

2.3.2 Warringah Development Control Plan 2011

The Warringah Development Control Plan 2011 (WDCP 2011) contains aims, objectives, and rules to achieve satisfactory development outcomes outlined in the land application map for the WDCP. The WDCP 2011 supplements the controls in the WLEP 2011 and establishes the standards, information requirements, aims, objectives and rules under which all development is to be assessed.

In relation to this FFIA, the site and scope of works Part E – *The Natural Environment*, of the WDCP 2011 aims to:

- *E3: Threatened species, populations, ecological communities listed under State or Commonwealth legislation, or High Conservation Habitat*
  - *To protect and promote the recovery of threatened species, populations and endangered ecological communities.*
  - *To protect and enhance the habitat of plants, animals and vegetation communities with high conservation significance.*
  - *To preserve and enhance the area's amenity, whilst protecting human life and property.*
  - *To improve air quality, prevent soil erosion, assist in improving water quality, carbon sequestration, storm water retention, energy conservation and noise reduction.*
  - *To provide natural habitat for local wildlife, maintain natural shade profiles and provide psychological & social benefits.*
- *E4: Wildlife Corridors*
  - *To preserve and enhance the area's amenity, whilst protecting human life and property.*
  - *To improve air quality, prevent soil erosion, assist in improving water quality, carbon sequestration, storm water retention, energy conservation and noise reduction.*
  - *To provide natural habitat for local wildlife, maintain natural shade profiles and provide psychological & social benefits.*
  - *To retain and enhance native vegetation and the ecological functions of wildlife corridors.*
- *E5 Native Vegetation*
  - *To preserve and enhance the area's amenity, whilst protecting human life and property.*
  - *To improve air quality, prevent soil erosion, assist in improving water quality, carbon sequestration, storm water retention, energy conservation and noise reduction.*
  - *To provide natural habitat for local wildlife, maintain natural shade profiles and provide psychological & social benefits.*
  - *Promote the retention of native vegetation in parcels of a size, condition and configuration which will as far as possible enable local plant and animal communities to survive in the long term.*
  - *To maintain the amount, local occurrence and diversity of native vegetation in the area*
- *E9 Coastal hazards*
  - *• To ensure that development does not adversely impact on the coastal processes affecting adjacent land.*
  - *• To retain the area's regional role for public recreation and amenity.*

The proposal will result in the clearing of approximately 0.03ha of Plant Community Type 3812 across all strata layers and will result in a minor reduction in the biodiversity values across the study area. The impacts and mitigation measure outlined in the FFIA aim to work in alignment with the WDCP 2011 and if considered by the proponent will result in minimal impacts to ecology and the environment.

Figure 2-1.E3 council mappingto Figure 2-4 details the result of inferences into council's DCP mapping system.

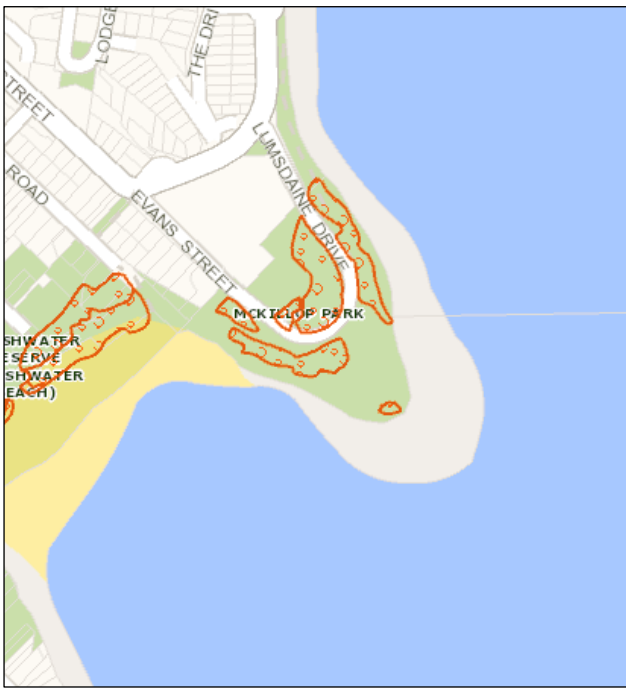

Figure 2-1.E3 council mapping

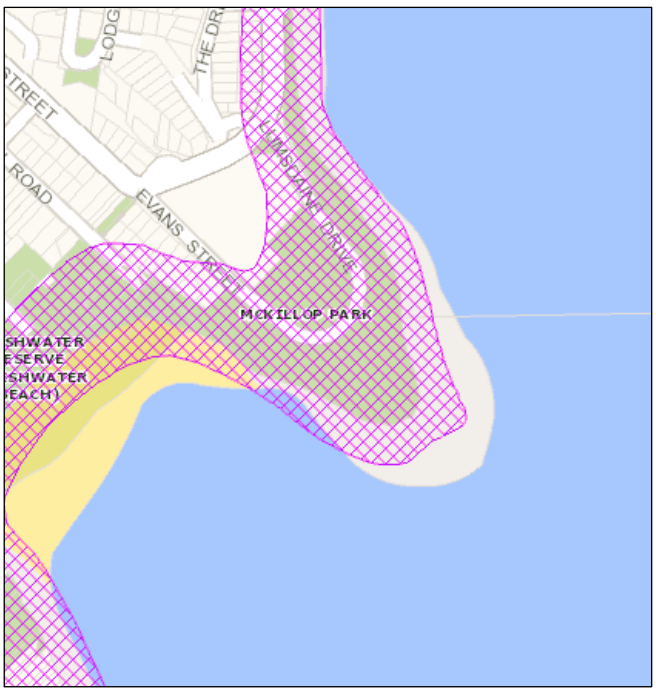

Figure 2-2.E4 council mapping

Figure 2-3.E5 council mapping

Figure 2-4.E9 council mapping

Figure 2-5. State Environmental Planning Policy (Resilience and Hazards) 2021.

3 Methods

3.1 Desktop Research

A preliminary desktop study was conducted to assess the likelihood of the site to support threatened species, populations or threatened ecological communities, or their habitats. All records of threatened species and populations within 5km of the subject site (10km locality search) were obtained from the Department of Planning and Environment BioNet Atlas database (DPE, 2022b), and the Federal Environment Department of Climate Change Energy the Environment and Water (DCCEEW) Protected Matters search tool (DCCEEW, 2021).

Other sources of data were reviewed including:

- SEED (DPE, 2022h)
- BioNet Vegetation Classification System (DPE, 2022c)
- eSpade (DPE, 2022i)
- Biodiversity Offset Scheme Entry Threshold Map (DPE, 2022a)
- National Flying-fox monitoring viewer (DCCEEW, 2022)
- ePlanning Spatial Viewer (DPE, 2022e)
- NSW State Environmental Planning Policy Koala Habitat Protection – Koala development application map (DPE, 2022f)

3.1.1 Threatened Species Likelihood of Occurrence

After reviewing the list of threatened species records, additional matters were considered in assessing which threatened species are likely to occur on the site. This included information such as the number of records within the 5km and 1km radius of the site, the dates of these records, the likelihood of detecting the species during a survey, the preferred species habitat requirements and whether the site contained suitable habitat for the species. The matrix criteria for assessment of the Likelihood of Occurrence are provided in Table 3-1.

The determination of species for likelihood assessment requires the exclusion of those species that are not relevant to the site including species that either have not been recorded on the site during the field investigations and/or are unlikely to be present on the site due to the absence of suitable habitats (i.e. Extremely Low category).

Table 3-1. Threatened species likelihood of occurrence matrix

		Likelihood of Occurrence based on further investigations e.g. field survey, up-to-date local monitoring records					
		Species identified and suitable habitat occurs within the Site	Species not identified but suitable habitat occurs within the Site	Species not identified but partially disturbed or degraded habitat occurs within the Site	Species not identified and no suitable habitat occurs within the Site	Species not identified but suitable habitat occurs within 1 km of the Site	Species not identified and suitable habitat occurs > 10 km away from the Site
Likelihood of Occurrence based on desktop assessments (BioNet and EPBC PMS)		1	2	3	4	5	6
Expected to occur during the Project (i.e. high abundance of recent records within 5 km)	1	DOES OCCUR	HIGH	HIGH	MEDIUM	MEDIUM	LOW
Could occur during the Project (i.e. some recent records within 5 km)	2	DOES OCCUR	HIGH	MEDIUM	MEDIUM	LOW	LOW
Possible under exceptional circumstances (i.e. low numbers of recent records within 5 km)	3	DOES OCCUR	MEDIUM	MEDIUM	LOW	LOW	LOW
Unlikely to occur during the Project (i.e. old records but low in numbers)	4	DOES OCCUR	MEDIUM	LOW	LOW	LOW	EXTREMELY LOW
Very unlikely to occur during the Project (i.e. only old records)	5	DOES OCCUR	LOW	LOW	LOW	EXTREMELY LOW	EXTREMELY LOW
Extremely rare or previously unknown to occur (i.e. no records)	6	DOES OCCUR	LOW	LOW	EXTREMELY LOW	EXTREMELY LOW	EXTREMELY LOW

3.2 Site Survey

A diurnal survey was conducted over one day on Wednesday the 24th of August 2022. Weather conditions were windy and sunny with a temperature ranging from 7.8˚C - 15.2˚C.

3.2.1 Vegetation Communities

The site was initially stratified using the State Vegetation Type Map (SVTM; DPE, 2022g), soil mapping and aerial imagery. The vegetation communities were verified via random meander (Cropper, 1993), the flora species list and the visual assessment of vegetation structure. Where required, the vegetation community types and boundaries were amended based on ground-truthing results.

3.2.2 Flora

A general flora survey was conducted over one day with reference to existing vegetation community descriptions (DPE, 2022g)and soil types (DPE, 2022i). Threatened flora likely to occur within the locality were surveyed using the *NSW Guide to Surveying Threatened Plants* (OEH, 2016a). General flora surveys were conducted by random meander (Cropper, 1993). The identification of native and exotic plant species was in accordance with:

- *Field Guide to the Native Plants of Sydney* (Robinson, 2003)
- *Flora of NSW, Volumes 1-4* (Harden, 1993a, 1993b, 2000, 2002)
- *Weeds of the south-east: an identification guide for Australia* (Richardson et al., 2011)
- *PlantNET*, with reference to recent taxonomic changes (National Herbarium of NSW, 2021).

All flora identified were recorded and an inventory of species was compiled see Appendix C. Flora Inventory.

3.2.3 Fauna

A general fauna survey was conducted over one day. The diurnal survey involved observations of animal activity, habitat identification and searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, scratches and diggings). Surveys for avifauna and amphibians involved visual detection and aural recognition of bird and frog calls.

The fauna survey was designed based on results from the desktop study and local knowledge of the area. All threatened species (and their habitat) known to occur within the locality were targeted during the fauna survey. The survey methods were conducted in accordance with the *Working Draft Threatened Biodiversity Survey and Assessment Guidelines* (DEC, 2004) as summarised in Table 3-2.

All fauna sightings, as well as fauna habitat types and evidence of fauna activity, were recorded and an inventory of species was compiled, see Appendix D. Fauna Inventory.

Table 3-2. Fauna survey methods

Taxa group	Time of day	Survey Methods	Recommended duration (per strata unit)	Time of year
Amphibian	Diurnal	Habitat search; logs, rocks, litter & base of trees	1 hour	Varies according to the seasonal peak of activity of target species
Avifauna	Diurnal	Area search	<1 ha (200 m x 500 m) 20-minute search is the most common method (Loyn 1986)	All year
Avifauna (migratory)	Diurnal	Area search	<1 ha (200 m x 500 m) 20-minute search is the most common method (Loyn 1986)	During migratory season
Mammals (excluding bats)	Diurnal	Active search	30 minutes active search for tree hollows, nests, scats, tracks and scratches	All year
		Track search	1 km of track search with emphasis on where substrate is soft	All year
Mammals (Bats)	Diurnal	Day habitat search	Search for bat excreta at or near potential habitats	All year

3.3 Limitations

As the surveys were undertaken at a discrete time of the year and during the day, it is possible that some species that may utilise the site were not recorded (i.e. migratory species, species present in soil bank, nocturnal species).

As stated by the DEC (2004) 'The absence of a species from survey data does not necessarily mean it does not inhabit the survey area. It may simply mean that the species was not detected at that time with the survey method adopted and the prevailing seasonal or climatic conditions. Therefore, the relative brevity of the survey and its timing mean that the full spectrum of fauna species and ecological processes likely to occur on the site cannot be fully quantified or described in this report.

These limitations have been partly addressed by identifying potential habitats for fauna species and assessing the potential for these species to occur on the site based on previous records, the type and condition of habitats present, the land use throughout the site, surrounds and the landscape context.

All spatial data collected used a hand-held GPS which is accurate to 5m.

4 Existing Environment

4.1 Landscape Features

4.1.1 Zoning

The site is located within the suburb of Freshwater, encompassed by the Northern Beaches Council LGA. The site is zoned as RE1 – 'Public Recreation'.

4.1.2 Soil Landscape

The entire site has been mapped as 'Lambert' (DPE, 2022i). This soil landscape typically consists of:

4.1.2.1 Geology

Hawkesbury Sandstone, which consists of medium to coarse-grained quartz sandstone with minor shale and laminite lenses.

4.1.2.2 Topography

Undulating to rolling low hills. Local relief 20–120 m and slopes <20%. Broad convex crests and plateau surfaces. Gently to moderately inclined sideslopes, often associated with small hanging valleys. Characteristic sandstone bedrock that outcrops as wide benches (10–100 m), with broken scarps 1–4 m high. Small, poorly drained seepage areas are common.

4.1.2.3 Vegetation

Predominantly uncleared open-heathlands, closed-heathlands and scrublands, with patches of low eucalypt woodland. The heathlands and scrublands are often exposed to strong winds. Their shallow, poorly drained soils fluctuate between being saturated or dry. Bushfires are frequent. Isolated lines and patches of trees are occasionally associated with joint crevices. Shrub she-oak *Allocasuarina distyla* and/or heath banksia *Banksia ericifolia* are usually dominant. Other shrubs such as spiky hakea *Hakea teretifolia* may be locally dominant in areas subject to seepage or prolonged saturation. Associated shrubs include various spider flowers *Grevillea* spp., billy buttons *Kunzea* spp., eggs and bacon *Pultenaea* spp., teatree *Leptospermum* spp. and native heath *Epacris* spp. Isolated occurrences of low eucalypt open-woodland with dry sclerophyll shrub understorey are found at sites with deeper soils and unimpeded soil drainage. Trees often have a mallee habit. Red bloodwood *Eucalyptus gummifera*, yellow-top ash *E. luehmanniana*, yellow bloodwood *E. eximia*, scribbly gum *E. haemastoma* and narrow-leaved apple *Angophora bakeri* are common mallee species. Growth of introduced species in urban areas is stunted. Native trees rarely attain a height of 10m.

Figure 4-1. Soil Landscape Mapping.

4.1.3 Acid Sulfate Soils

Acid sulfate soils are not known to occur on or in proximity to the site.

4.1.4 Topography and Aspect

The site consists of minor undulations in terrain across varying terrain such as rock, sand, and soil. The site has an elevation of approximately 30m above sea level (asl) with an easterly aspect.

4.1.5 Ecological Values

The sites vegetation currently provides a range of ecological values such as foraging and sheltering habitat for mammal, bird and reptile species such as those identified during the site survey (Appendix D. Fauna Inventory). The vegetative structures such as the dense pockets of heath and presence of moisture laden vegetation and soaks has the potential to further offer habitat for small mammal and amphibian species. The rock crevices and structures offer sheltering and foraging habitat for species of reptiles such as Eastern Blue-tongue Lizards (*Tiliqua scinciodes*) identified on site, and mau provide sheltering and foraging habitat for species of frogs. Figure 4-2 to Figure 4-5 outlines the varying habitat types and niches filled by species found on site.

Figure 4-2. Eastern Blue-tongue Lizard (*Tiliqua scinciodes*)

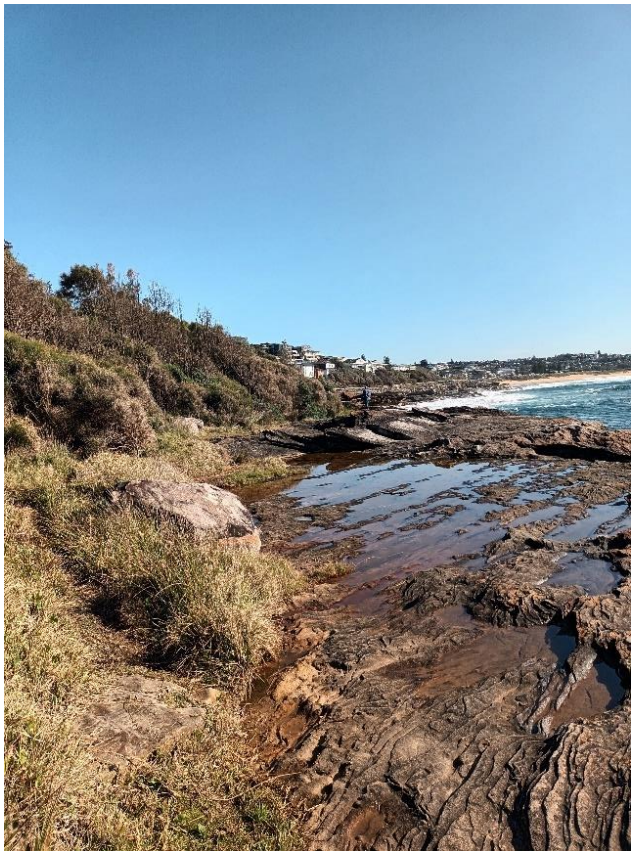

Figure 4-3. Moisture laden vegetation

Figure 4-4. Dense heath

Figure 4-5. Dense ground stratum

4.1.6 Adjacent Lands and Connectivity

The site is situated on the coastline within a public recreational zone and is surrounded by residential zones, Curl Curl and Freshwater Beach and the South Pacific Ocean. The vegetation on site currently provides North-South connectivity across the landscape and consists of remnant vegetation with pockets of revegetation activities.

4.1.7 Phytophthora

Phytophthora has been mapped at various locations surrounding the site, as displayed in Figure 4-6. No signs of Phytophthora where present during the site surveys. Mitigation measures and Phytophthora Hygiene Protocols are outlined in Appendix J. Phytophthora Hygiene Protocols and provide appropriate protocols and methodologies to minimise the spread of Phytophthora to the site.

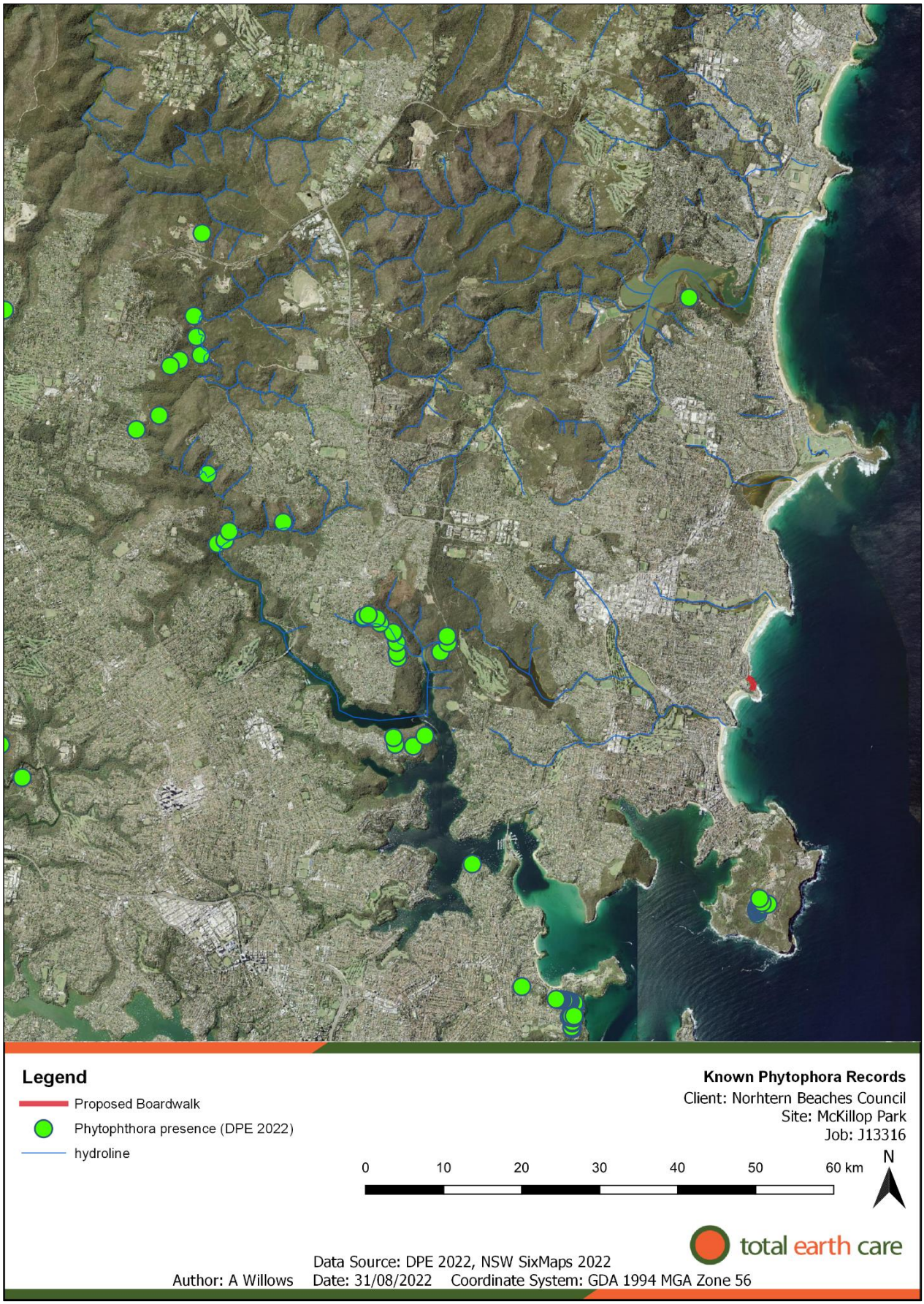

Figure 4-6. Known Phytophthora Presence.

4.2 Plant Community Types

4.2.1 Previously Mapped Plant Community Types

Previous broad-scale vegetation mapping (DPE, 2022g) of the locality has identified Plant Community Type (PCT) 3812 - *Sydney Coastal Sandstone Heath* mapped in proximity to and across the entirely of the site as outlined Figure 4-7.

4.2.1.1 PCT 3812

Plant Community Type 3812 has the following descriptive attributes as outlined in the BioNet Vegetation Classification system (DPE, 2022c):

A mid-high to tall, closed heathland found on rocky Hawkesbury sandstone ocean and harbour headlands along the metropolitan Sydney coastline. Sites are typically windblown and emergent eucalypts are rare. The upper stratum is almost always dominated by Banksia ericifolia *and* Allocasuarina distyla*.* Kunzea ambigua *or* Kunzea capitata *may also be locally abundant, and sites where these species dominate appear to have been disturbed in the past. Other woody shrubs very frequently or commonly include* Acacia longifolia*,* Hakea teretifolia*,* Darwinia fascicularis*,* Baeckea imbricata *and* Leptospermum squarrosum*, with the rare sprawling shrub* Rulingia hermanniifolia *occasionally encountered in the lower shrub layer. Long unburnt or disturbed sites may occasionally include* Pittosporum undulatum*,* Elaeocarpus reticulatus *or* Glochidion ferdinandi*. The ground layer commonly has a sparse cover of sedges and graminoids including* Lepidosperma viscidum*,* Xanthorrhoea resinosa *and* Lepyrodia scariosa*. This PCT is found at many of the prominent vantage points of Sydney Harbour including Barrenjoey, Middle, North and South heads and Kurnell and Bundeena peninsulas. These are mostly flat plateau-like landforms that have minor sandstone benching and outcropping. This PCT covers a narrow environmental range from 20-90m asl and 1190-1240 mm mean annual rainfall.*

4.2.2 Ground-truthed Vegetation

The plant species and vegetative structure identified on site, soil and the BioNet Vegetation Classification systems were utilised to ground-truth the plant community type within and in proximity to the site. The plant species outlined in Appendix C. Flora Inventory has identified 13 out of 36 native flora species respective of PCT 3812 including high frequency species such as *Banksia ericifolia* (Heath-leaved Banksia) *Allocasuarina distyla* and *Leptospermum laevigatum* (Coast Teatree). Figure 4-8 details the location of the ground-truthed PCT. The site soil profile consisted predominantly of sandstone at an elevation of ~30m asl and contained a closed heath community structure based off visual observations.

PCT 3812 identified on site is not associated nor conforms with any BC Act of EPBC act listed TECs

As outlined in Figure 4-8 a portion of this site has been identified as a mixed exotic and native vegetation based of the species assemblages identified in this area and historical PCT mapping.

Figure 4-7-Previously mapped plant communities (DPE, 2022).

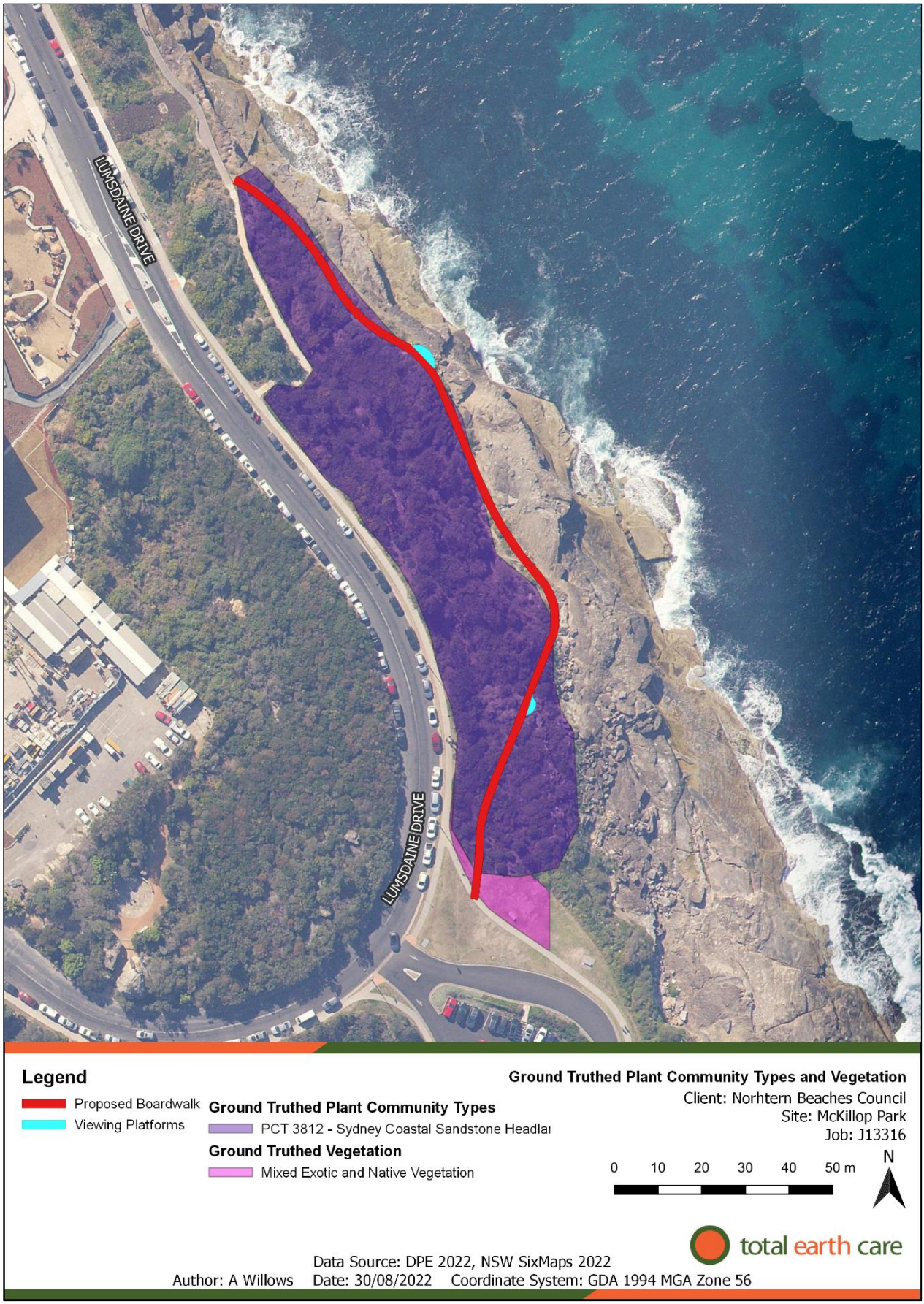

Figure 4-8 Ground-truthed Plant Community Types and Vegetation.

4.3 Flora

A total of 63 plant species were recorded during the flora survey, 38 of which were native and 25 exotic. All flora species recorded during the current survey are listed Appendix C. Flora Inventory. No threatened flora species were identified during the survey.

4.3.1 Threatened Flora Species

No threatened flora species or populations were identified during the site survey. The NSW BioNet Atlas (DPE, 2022a) identified 7 threatened flora species recorded within 5km of the site. The EPBC Protected Matters Search Tool Report (DCCEEW, 2021) identified an additional 7 threatened flora species previously recorded within a 5km radius of the site or which may have habitat nearby as outlined in Table 4-1. Of these 14 threatened flora species, none were deemed of having a high likelihood of occurring on site (refer to Appendix F. Threatened Flora Likelihood of Occurrence).

Table 4-1. Threatened flora species previously recorded within 5km radius of the site

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Source
Acacia bynoeana	Bynoe's Wattle	E1	V	EPBC PMS
Callistemon linearifolius	Netted Bottle Brush	V,3	-	BioNet
Chamaesyce psammogeton	Sand Spurge	E1	-	BioNet
Epacris purpurascens* var. *purpurascens	-	V	-	BioNet
Eucalyptus camfieldii	Camfield's Stringybark	V	V	BioNet, EPBC PMS
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	BioNet
Melaleuca biconvexa	Biconvex Paperbark	V	V	BioNet, EPBC PMS
Persoonia hirsuta	Hairy Geebung	E1,P,3	E	BioNet, EPBC PMS
Pimelea curviflora* var. *curviflora	-	V	V	BioNet, EPBC PMS
Prostanthera marifolia	Seaforth Mintbush	E4A,3	CE	BioNet, EPBC PMS
Rhodamnia rubescens	Scrub Turpentine	E4A	-	BioNet, EPBC PMS
Senecio spathulatus	Coast Groundsel	E1	-	BioNet
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	BioNet, EPBC PMS
Tetratheca glandulosa	-	V	-	BioNet

BC Act Status: V – Vulnerable, E1 - Endangered, E4A - Critically Endangered, P – Protected, 2 – Category 2 sensitive species, 3 - Category 3 sensitive species

EPBC Act Status: X = Extinct, CE - Critically Endangered, E – Endangered, V – Vulnerable.

4.3.2 Flora Habitats

The flora habitat on site consisted of dense closed heath on sandstone with intermitted pockets of moist ground potentially caused by soaks and urban run-off. The site is limited in its distribution and is subject to hard barriers such as roads and the ocean, however there are patches of vegetation in proximity to the site that will provide genetic exchange and support the associated PCT across the landscape.

4.3.3 Weeds

Of the 25 exotic species identified on site, two species, *Lantana camara (*Lantana) and *Asparagus aethiopicus* (Asparagus Fern) are both listed under the *Greater Sydney Regional Strategic Weed Management Plan 2017-2022* (LLS, 2019) and as Weeds of National Environmental Significance (WoNS).

All weed species which require management under the *Biosecurity Act 2015* are listed in Appendix E. Weed Species listed as a Biosecurity Risk, along with category of management and recommended treatment methods.

4.4 Fauna

A total of five native fauna species and one introduced species were recorded during the fauna survey. Fauna species recorded during the site survey are listed in Appendix D. Fauna Inventory.

4.4.1 Threatened Fauna Species and Populations

One Eastern Osprey (*Pandion cristatus*) listed as vulnerable under the BC Act was observed in proximity to the site. The NSW Bionet Atlas (DPE, 2022b) identified 67 threatened fauna species recorded within 5km of the site. The EPBC Protected Matters Search Tool Report (DCCEEW, 2022) identified an additional 56 threatened fauna species previously recorded within a 5km radius of the site or which may have habitat nearby. These species are listed in Table 4-2.

Table 4-2. Threatened fauna species previously recorded within a 5km radius of the site

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Source
Actitis hypoleucos	Common Sandpiper	P	C,J,K	BioNet & PMST
Anous stolidus	Common Noddy	P	C,J	BioNet & PMST
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE	BioNet & PMST
Apus pacificus	Fork-tailed Swift	P	C,J,K	BioNet & PMST
Arctocephalus pusillus doriferus	Australian Fur-seal	V,P		BioNet
Ardenna carneipes	Flesh-footed Shearwater	V,P	J,K	BioNet & PMST
Ardenna grisea	Sooty Shearwater	P	J	BioNet & PMST
Ardenna pacifica	Wedge-tailed Shearwater	P	J	BioNet
Ardenna tenuirostris	Short-tailed Shearwater	P	C,J,K	BioNet
Arenaria interpres	Ruddy Turnstone	P	C,J,K	BioNet
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		BioNet
Botaurus poiciloptilus	Australasian Bittern	E1,P	E	PMST
Burhinus grallarius	Bush Stone-curlew	E1,P		PMST
Calidris acuminata	Sharp-tailed Sandpiper	P	C,J,K	BioNet
Calidris alba	Sanderling	V,P	C,J,K	BioNet & PMST
Calidris canutus	Red Knot	P	E,C,J,K	BioNet
Calidris ferruginea	Curlew Sandpiper	E1,P	CE,C,J,K	BioNet & PMST
Calidris melanotos	Pectoral Sandpiper	P	J,K	BioNet & PMST
Calidris ruficollis	Red-necked Stint	P	C,J,K	PMST
Calidris tenuirostris	Great Knot	V,P	CE,C,J,K	BioNet
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3		BioNet
Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2		BioNet & PMST

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Source
Cercartetus nanus	Eastern Pygmy-possum	V,P	V	BioNet
Chalinolobus dwyeri	Large-eared Pied Bat	V,P		BioNet & PMST
Charadrius leschenaultii	Greater Sand-plover	V,P	V	BioNet & PMST
Charadrius mongolus	Lesser Sand-plover	V,P	-	BioNet
Chelonia mydas	Green Turtle	V,P	-	BioNet
Chlidonias leucopterus	White-winged Black Tern	P	-	BioNet
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P	-	PMST
Cuculus optatus	Oriental Cuckoo	P	-	BioNet
Daphoenositta chrysoptera	Varied Sittella	V,P	-	PMST
Dasyornis brachypterus	Eastern Bristlebird	E1,P,2	-	BioNet
Diomedea antipodensis	Antipodean Albatross	V,P	-	PMST
Diomedea epomophora	Southern Royal Albatross	P	-	PMST
Diomedea exulans	Wandering Albatross	E1,P	-	BioNet & PMST
Diomedea sanfordi	Northern Royal Albatross		-	PMST
Erythrotriorchis radiatus	Red Goshawk	E4A,P,2	-	PMST
Esacus magnirostris	Beach Stone-curlew	E4A,P	-	BioNet
Eudyptula minor	Little Penguin	E2,P	-	BioNet
Falco hypoleucos	Grey Falcon	E1,P,2	-	PMST
Fregata ariel	Lesser Frigatebird	P	-	PMST
Fregata minor	Great Frigatebird	P	-	PMST
Fregetta grallaria	White-bellied Storm-Petrel	V,P	-	PMST
Gallinago hardwickii	Latham's Snipe	P	-	BioNet & PMST
Glossopsitta pusilla	Little Lorikeet	V,P	-	BioNet
Grantiella picta	Painted Honeyeater	V,P	-	PMST
Gygis alba	White Tern	V,P	-	BioNet
Haematopus fuliginosus	Sooty Oystercatcher	V,P	-	BioNet
Haematopus longirostris	Pied Oystercatcher	E1,P	-	BioNet
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P	-	BioNet & PMST
Heleioporus australiacus	Giant Burrowing Frog	V,P	-	BioNet & PMST
Hieraaetus morphnoides	Little Eagle	V,P	-	BioNet
Hirundapus caudacutus	White-throated Needletail	P	-	BioNet & PMST
Hoplocephalus bungaroides	Broad-headed Snake	E1,P,2	-	PMST
Hydroprogne caspia	Caspian Tern	P	-	BioNet
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E1,P	-	BioNet & PMST
Ixobrychus flavicollis	Black Bittern	V,P	-	BioNet
Lathamus discolor	Swift Parrot	E1,P,3	-	
Limosa lapponica	Bar-tailed Godwit	P	-	BioNet & PMST
Limosa lapponica baueri	Bar-tailed Godwit (baueri)	P	-	BioNet & PMST
Litoria aurea	Green and Golden Bell Frog	E1,P	-	PMST
Lophoictinia isura	Square-tailed Kite	V,P,3	-	BioNet & PMST
Macronectes giganteus	Southern Giant Petrel	E1,P	-	BioNet

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Source
Macronectes halli	Northern Giant-Petrel	V,P	-	BioNet & PMST
Meridolum maryae	Maroubra Woodland Snail	E1	-	PMST
Miniopterus australis	Little Bent-winged Bat	V,P	-	BioNet
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P	-	BioNet
Mixophyes balbus	Stuttering Frog	E1,P,2	V	PMST
Motacilla flava	Yellow Wagtail	P	C,J,K	PMST
Myotis macropus	Southern Myotis	V,P		BioNet
Neophema chrysogaster	Orange-bellied Parrot	E4A,P,3	CE	PMST
Ninox connivens	Barking Owl	V,P,3		BioNet
Ninox strenua	Powerful Owl	V,P,3		BioNet
Numenius madagascariensis	Eastern Curlew	P	CE,C,J,K	BioNet & PMST
Numenius phaeopus	Whimbrel	P	C,J,K	BioNet
Onychoprion fuscata	Sooty Tern	V,P		BioNet
Pachyptila turtur subantarctica	Southern Fairy Prion		V	PMST
Pandion cristatus	Eastern Osprey	V,P,3		BioNet
Perameles nasuta	Long-nosed Bandicoot, North Head	E2,P		BioNet
Petauroides volans	Greater Glider	P	V	PMST
Petaurus australis	Yellow-bellied Glider	V,P		PMST
Petrogale penicillata	Brush-tailed Rock-wallaby	E1,P	V	PMST
Phascolarctos cinereus	Koala	V,P	V	BioNet
Phoebetria fusca	Sooty Albatross	V,P	V	PMST
Pluvialis fulva	Pacific Golden Plover	P	C,J,K	
Pluvialis squatarola	Grey Plover	P	C,J,K	BioNet
Pseudomys novaehollandiae	New Holland Mouse	P	V	BioNet
Pseudophryne australis	Red-crowned Toadlet	V,P		PMST
Pterodroma leucoptera leucoptera	Gould's Petrel	V,P	E	BioNet
Pterodroma neglecta neglecta	Kermadec Petrel (west Pacific subspecies)	V,P	V	BioNet & PMST
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	PMST
Ptilinopus magnificus	Wompoo Fruit-Dove	V,P		BioNet & PMST
Ptilinopus regina	Rose-crowned Fruit-Dove	V,P		BioNet
Ptilinopus superbus	Superb Fruit-Dove	V,P		BioNet
Rostratula australis	Australian Painted Snipe	E1,P	E	PMST
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		BioNet
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		BioNet

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Source
Sterna hirundo	Common Tern	P	C,J,K	BioNet
Sternula albifrons	Little Tern	E1,P	C,J,K	BioNet & PMST
Sternula nereis nereis	Australian Fairy Tern	P	V	PMST
Sula leucogaster	Brown Booby	P	C,J,K	BioNet
Thalassarche bulleri	Buller's Albatross	P	V	BioNet & PMST
Thalassarche bulleri platei	Northern Buller's Albatross	P	V	PMST
Thalassarche cauta	Shy Albatross	V,P	V	BioNet & PMST
Thalassarche eremita	Chatham Albatross	P	E	PMST
Thalassarche impavida	Campbell Albatross	P	V	PMST
Thalassarche melanophris	Black-browed Albatross	V,P	V	BioNet & PMST
Thalassarche salvini	Salvin's Albatross	P	V	PMST
Thalassarche steadi	White-capped Albatross	P	V	PMST
Thalasseus bergii	Crested Tern	P	J	BioNet
Thinornis cucullatus cucullatus	Hooded Plover	P	V	BioNet
Tringa brevipes	Grey-tailed Tattler	P	C,J,K	BioNet
Tringa nebularia	Common Greenshank	P	C,J,K	BioNet & PMST
Tringa stagnatilis	Marsh Sandpiper	P	C,J,K	BioNet
Tyto novaehollandiae	Masked Owl	V,P,3		BioNet
Thalassarche steadi	White-capped Albatross	P	V	BioNet
Thalasseus bergii	Crested Tern	P	J	BioNet & PMST
Thinornis cucullatus cucullatus	Hooded Plover	P	V	BioNet & PMST
Tringa brevipes	Grey-tailed Tattler	P	C,J,K	BioNet
Tringa nebularia	Common Greenshank	P	C,J,K	BioNet
Tringa stagnatilis	Marsh Sandpiper	P	C,J,K	BioNet
Tyto novaehollandiae	Masked Owl	V,P,3		BioNet
Varanus rosenbergi	Rosenberg's Goanna	V,P		BioNet

BC Act Status – V – Vulnerable, E1 Endangered, E4A - Critically Endangered, P – Protected, 2 – Category 2 sensitive species, 3 - Category 3 sensitive species
EPBC Act Status - CE - Critically Endangered, E – Endangered, V – Vulnerable, C – Camba, J – Jamba, K – Rockamba

Of these 123 threatened fauna species, nine were deemed to have a high likelihood of occurring on site (Appendix G. Threatened Fauna Likelihood of Occurrence). These are:

- Eastern Pygmy-possum (*Cercartetus nanus*) – Vulnerable under the BC Act
- Long-nosed Bandicoot, North Head (*Perameles nasuta*) – Endangered Population under the BC Act
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – Vulnerable under the BC Act
- Large-eared Pied Bat (*Chalinolobus dwyeri*) – Vulnerable under the BC Act and Vulnerable under the EPBC Act
- Little Bent-winged Bat (*Miniopterus australis*) – Vulnerable under the BC Act
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable under the BC Act and Vulnerable under the EPBC Act
- Red-crowned Toadlet (*Pseudophryne australis*) – Vulnerable under the BC Act
- White-bellied Sea-Eagle (*Haliaeetus leucogaster*) – Vulnerable under the BC Act
- Eastern Osprey (*Pandion cristatus*) – Vulnerable under the BC Act

4.4.2 Fauna Habitats

Site specific fauna habitat features and resources identified in Figure 4-9 and Figure 4-10 are required by native fauna for the maintenance of life cycles. Key habitat features and associated fauna identified during the survey are discussed in the following sections and outlined in Figure 4-11.

4.4.2.1 Bush Rock

A number of rock crevices were identified that were observed on site. These crevices have the potential to offer habitat for a range of small mammal, reptile and amphibian species. In particular, species such as Eastern Blue-tongue Lizards (*Tiliqua scincoides*) were identified (Figure 4-11) thermoregulating in proximity to these crevices and are likely to use them for sheltering habitat.

4.4.2.2 Shrub Layer

The site is characterised by a dense shrub layer across its entire extent. This shrub layer has the potential to offer sheltering and foraging habitat for a range of small mammal, reptile, amphibian and bird species such as small insectivorous birds. In particular, Superb Fairy-wrens (*Malurus cyaneus*) were identified foraging on site.

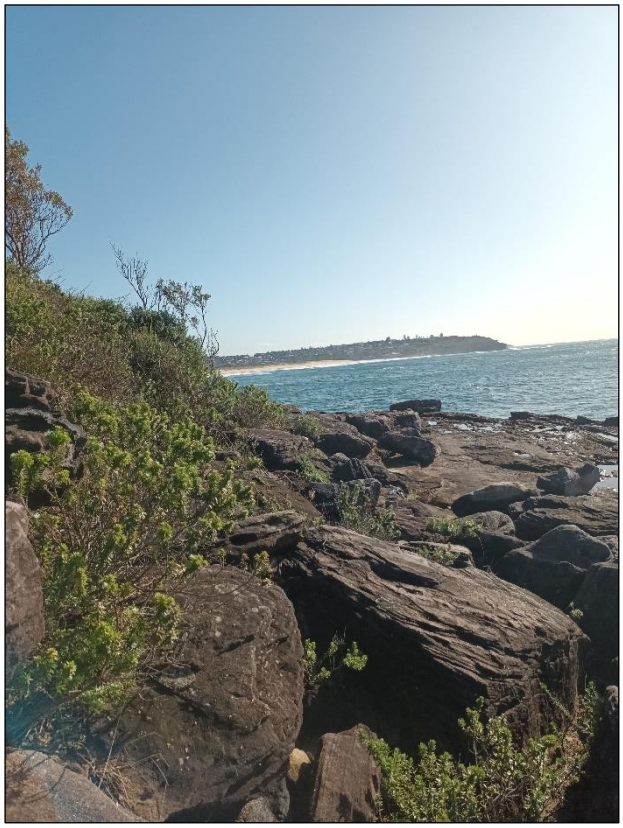

Figure 4-9-. Rock crevices.

Figure 4-10. Shrub Layer.

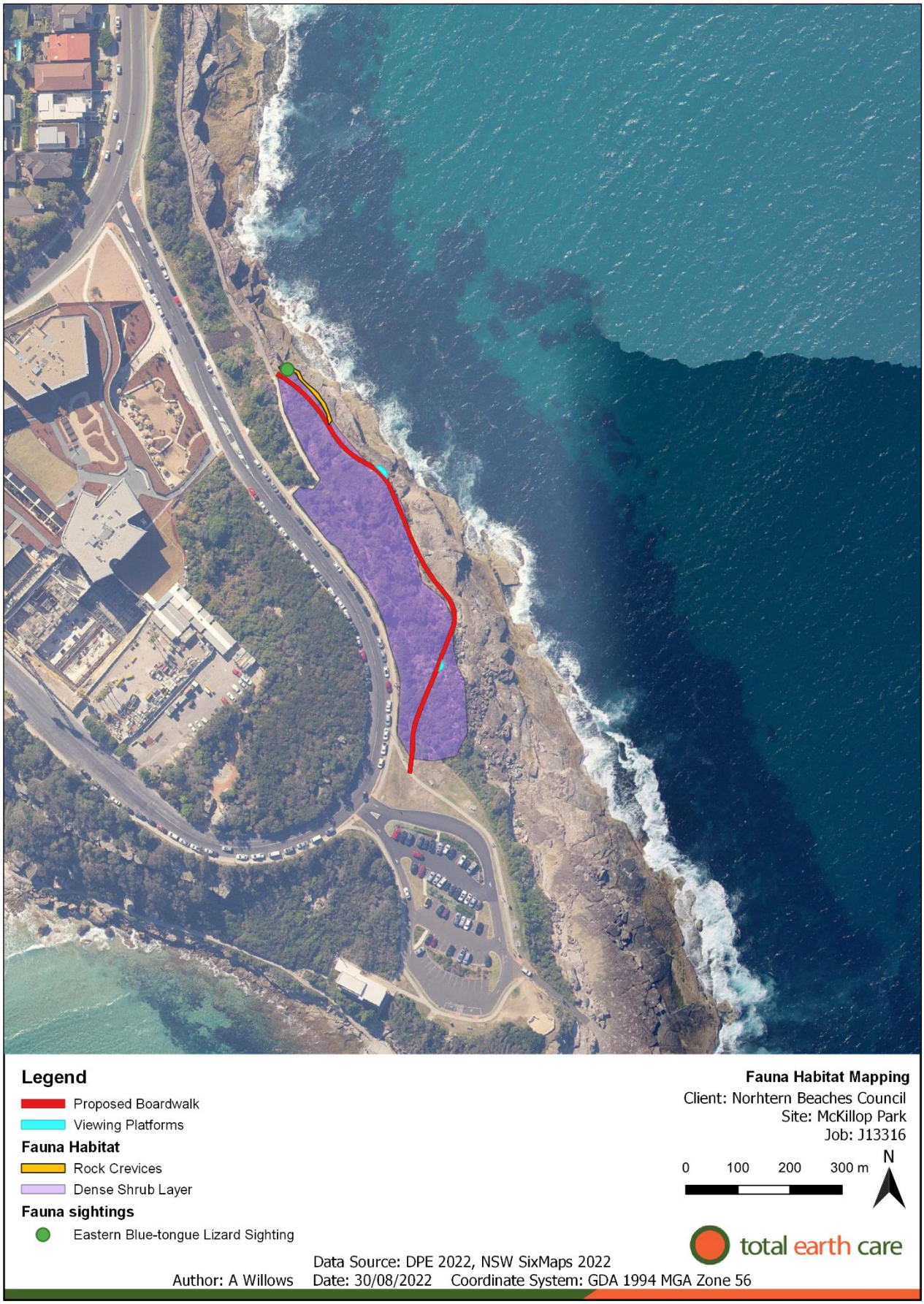

Figure 4-11- Fauna Habitat.

5 Impact Assessment

5.1 Direct Impacts

5.1.1 Construction Impacts

5.1.1.1 Direct Impacts to Flora

The proposal is set to remove approx. 0.03ha of PCT 3812. The removal of this vegetation will result in impacts across all stratum layers and the seedbank. The vegetation on site is in good condition and is likely to offer a high level of resilience to impacts, if weed and exotic species are managed before, during and after the construction activities commence. The importation of materials to the site must also adhere to Biosecurity practices such as Arrive Clean, Leave Clean and the mitigation measures outlined in Table 6-1 in order to reduce invasive species incisions. Trampling of vegetation outside of the proposal development footprint must be avoided as this will result in further impacts vegetation and soil compaction affecting root balls. Any increases in sedimentation likely to impact vegetation must be managed in accordance with the sites Review of Environmental Factors.

5.1.1.2 Direct Impacts to Fauna

The proposal is set to remove approx. 0.03ha of PCT 3812. The removal of this vegetation is likely to cause a reduction in the extent of available habitat for the species identified on site and any threatened species highly likely to be present on site. The habitat in the broader locality has the potential to offset this reduction in habitat by providing habitat for any displaced fauna to reside in. The removal of this vegetation is therefore unlikely to result in a significant impact to threatened and protected fauna species. Other potential direct impacts to native fauna would result from direct strikes by construction equipment.

This proposal will result in a minor impact to the fauna in the medium to long term with the implementation of the Mitigation Measures outlined in this report. Assessments of Significance (5 Part Test) have been prepared for the threatened species with a high likelihood of occurring in Appendix I. Assessments of Significance, that are likely to be directly or indirectly impacted by the proposal.

5.1.1.3 Key Threatening Processes

There is an increase in Key Threatening Processes (KTPs) across the site through the removal of native vegetation and a potential increase in the distribution of invasive vine species such as *Rumex sagittatus* (Turkey rhubarb) and *Ipomoea indica* (Morning Glory), identified on site. The increase in the removal of native vegetation is deemed unavoidable by the proposal, however due to the minor extent of the vegetation being cleared it is unlikely to be a significant increase in the KTP - *Clearing of Native Vegetation*. The invasive vine species must be managed in accordance with Appendix E. Weed Species listed as a Biosecurity Risk.

5.1.2 Post- Construction Impacts

5.1.2.1 Direct Impacts to Flora and Fauna

The establishment of the elevated boardwalk is likely to shade any vegetation growing under the boardwalk and lead to the regeneration of shade tolerant species within these areas. The shaded area will lead to a reduction in the available flora and fauna habitat across the site as a result of this.

5.2 Indirect Impacts

5.2.1 Construction Impacts

5.2.1.1 Introduction of Invasive Species and Pathogens

The increased disturbance during construction has the potential to increase the occurrence and prevalence of non-native and invasive species. However, if appropriate biosecurity measures and hygiene protocols (i.e. wash down vehicles in situ) are maintained, this risk could be reduced and is highly manageable. The proposal would require the importation and exportation of materials and equipment in and out of the site. There is the potential that disease including pathogens that may affect native species could be brought into the site via construction equipment and materials, however this may be reduced with the implementation of best practice hygiene methods. Phytophthora hygiene protocols should be implemented during construction to reduce the risk of phytophthora entering the site (Appendix J. Phytophthora Hygiene Protocols). This will result in a moderate impact in the short to medium term due to the importation of construction materials into an area that has minimal presence of invasive species and no records of Phytophthora (Figure 4-6).

5.2.1.2 Erosion

Increases in erosive action as a result of the proposal has the potential to alter sediment loads across the site and within the study area. This can result in indirect impacts to flora species either through the loss of soil or increased sediment loads to individuals and their surrounding soil profile affecting their lifecycle.

5.2.2 Post-Construction Impacts

5.2.2.1 Hydrology

The proposal will have a minor impact on the surface hydrology across the sites due to the reduction in surface area receiving water from the boardwalk. This is likely to result in a minor impact to flora species in close proximity to the site relying on access to this hydrological source and actions. The installation of the footings for the boardwalk will also lead to a minor reduction in soil moisture availability due to soil compaction and setting of the footings with materials such as concrete. The removal of vegetation will likely result in minor alterations to hydrological actions through a reduction in root extraction of water through the soil profile. This will likely result in a minor impact in the medium to long term.

5.2.2.2 Connectivity and Resilience

The loss of vegetation across the site is likely to result in a minor reduction in the connectivity. As the loss of vegetation is not resulting in fragmenting the site, it is unlikely to result in a significant reduction in connectivity across the site and study area. The vegetation surrounding the site has also indicated good resilience and if appropriate weed management actions are adhered to, this is likely to remain so. The proposal will result in a negligible impact in the medium to long term.

6 Conclusions and Management Measures

6.1 Summary and Conclusion

The proposal does not pose a significant impact to threatened species or TECs and therefore does not require a BDAR or a Species Impact Statement.

The proposed works will result in minor direct impacts to biodiversity as a small extent of vegetation in good condition will removed. Although the site may be utilised by locally dependent species, there is extensive preferred habitat in adjacent areas which will mitigate the loss of habitat on site. Therefore, the proposal is unlikely to cause a significant impact to threatened species. There is a potential increase in KTPs across the site and study area however the Mitigation Measures will minimise these increase and result in an insignificant impact

In summary:

- No threatened species or TECs were identified on site
- Approximately 0.03ha of PCT 3812 will be removed as a part of the proposal
- The vegetation identified across the site is likely to provide habitat for locally dependent fauna
- No fauna habitat requires removal or will be significantly impacted by the proposal
- One Eastern Osprey was identified within the study area but is unlikely to utilise the site to complete its life cycle
- Indirect and direct impacts include increased vulnerability to invasive species and KTPs, and alterations to hydrology and sedimentary process

6.2 Mitigation Measures

The following mitigation measures are to be implemented as part of the construction process. Taking into consideration the results from the desktop research and site surveys, site specific mitigation measures are made in order to either reduce the impacts of the proposal on the sites biodiversity values, or to ensure potential impacts to the retained vegetation and biodiversity on the site is minimised. The mitigation measures are provided in Table 6-1

Table 6-1. Mitigation measures

Safeguards	Responsibility	Timing
During clearing works or construction works, if any species of threatened flora or fauna are identified, works must stop immediately and a qualified Ecologist should be contacted.	All personnel on site	Pre-construction and construction
All vegetation to be retained must be appropriately protected during the entire extent of the works, e.g. temp fencing, flagging and tree protection. If clearing is to occur outside the assessed area within this FFIA, this document must be amended by a suitably qualified Ecologist to include all new scope, prior to works commencing.	Construction contractor/Project Manager	Construction
Inspect vegetation for potential fauna prior to clearing or trimming. Undertake a two staged approach for removing non-habitat vegetation to enable fauna to move away. Engage an Ecologist if clearing vegetation with potential fauna habitat or assistance is required to move fauna.	Construction contractor/Project Manager	Pre-construction and construction
If any fauna are identified during works and require rescue, a qualified Ecologist, or fauna rescue volunteer, is to be notified. Works should not continue until the animal has been rescued. Call either Sydney Metro Wildlife on 9413 4300 or WIRES on 1300 094 737.	All personnel on site	Pre-construction and construction
Erosion and sediment control must be detailed in a Construction and Environmental Management Plan (CEMP), including types of control, method of installation, locations, maintenance regime, responsibilities,	Construction contractor	Pre-construction

and stockpile storage. All sedimentation and erosion control measures will be designed, installed, and maintained using procedures outlined in the Standards of the Soil Conservation Service of NSW, WR Volume 4 and Managing Urban Stormwater: Soils and Construction 2004 4th edition (Landcom, 2004). Controls are to maintained daily and installed prior to any construction activity.		
The natural soil levels around the trees to be retained must not be altered without consultation with a qualified arborist.	Construction contractor/Project Manager	Pre-construction and construction
Follow strict Phytophthora hygiene (Appendix J), including the wash down of mud on machinery, vehicles and footwear and the use of 3:1 methylated spirits and water spray.	All personnel on site	Pre-construction and construction
Manage biosecurity in accordance with: • *Biosecurity Act 2015* (see NSW Weedwise). • Best practise bush regeneration techniques, including disposal of sealed bagged weeds to a licenced waste disposal facility.	All personnel on site	Pre-construction and construction
Implement best practice for hygiene to prevent the spread of invasive weeds. Inspect vehicles and plants for mud and soils before entering and leaving site. Stockpiles of materials containing invasive weed plant matter should be covered and bunded to prevent spread.	All personnel on site	Pre-construction and construction
Stockpiling or refuelling must be undertaken in allocated areas such as existing asphalt and/or hard standing or cleared grassy area. Stockpiles and refuelling areas are to be clearly marked and have the appropriate bunding and erosion and sediment controls in place.	Construction contractor/Project Manager	Stockpiling or refuelling must be undertaken in allocated areas such as existing asphalt and/or hard standing or cleared grassy area. Stockpiles and refuelling areas are to be clearly marked and have the appropriate bunding and

		erosion and sediment controls in place.
Heavy machinery, plant or equipment are to be stored in allocated areas. These must be on hardstand areas or previously cleared areas.	Construction contractor/Project Manager	Heavy machinery, plant or equipment are to be stored in allocated areas. These must be on hardstand areas or previously cleared areas.
Manage waste and excess spoil in accordance with the *NSW EPA Waste Classification Guidelines* (EPA, 2014). Dispose of waste (including weed materials) at an appropriately licenced facility.	Construction contractor/Project Manager	Pre-construction and construction
All waste must be stored in ancillary areas and removed from site to a suitably licenced waste facility.	Construction contractor/Project Manager	Pre-construction and construction

7 References

Cropper, S. C. (1993). *Management of endangered plants* (CSIRO, V. D. of C. and N. Resources, & A. N. C. Agency (eds.)). CSIRO.

DCCEEW. (2021). *Protected Matters Search Tool*. Department of Climate Change, Energy, the Environment and Water. https://www.awe.gov.au/environment/epbc/protected-matters-search-tool

DCCEEW. (2022). *National Flying-fox monitoring viewer*. Department of Climate Change, Energy, the Environment and Water. https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf

DEC. (2004). *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft*. Department of Environment and Conservation. www.environment.nsw.gov.au

DPE. (2017a). *Large-eared Pied Bat - profile*. Department of Planning and Environment. https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10157

DPE. (2017b). *Long-nosed Bandicoot, North Head - profile*. Department of Planning and Environment. https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10589#:~:text=A nocturnal marsupial of medium,above and creamy white below.

DPE. (2017c). *Red-crowned Toadlet - profile*. Department of Planning and Environment. https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10692#:~:text=Description,the base of each arm.

DPE. (2019a). *Large Bent-winged Bat - profile*. Department of Planning and Environment. https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10534

DPE. (2019b). *White-bellied Sea-Eagle - profile*. Department of Planning and Environment. https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20322

DPE. (2020a). *Eastern Osprey - profile*. Department of Planning and Environment. https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10585

DPE. (2020b). *Grey-Headed Flying-Fox - profile*. Department of Planning and Environment. https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10697

DPE. (2020c). *Little Bent-winged Bat - profile*. Department of Planning and Environment. https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10533

DPE. (2022a). *Biodiversity Values Map and Threshold tool*. Department of Planning and Environment. https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap

DPE. (2022b). *BioNet Atlas*. Department of Planning and Environment. https://www.environment.nsw.gov.au/asmslightprofileapp/account/login?ReturnUrl=%252fAtlasApp%252fDefault.aspx

DPE. (2022c). *BioNet Vegetation Classification*. Department of Planning and Environment. https://www.environment.nsw.gov.au/NSWVCA20PRapp/default.aspx

DPE. (2022d). *Eastern Pygmy-possum - profile*. Department of Planning and Environment. https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10155

DPE. (2022e). *ePlanning Spatial Viewer*. Department of Planning and Environment. https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address

DPE. (2022f). *NSW State Environmental Planning Policy Koala Habitat Protection -Koala development application map*. Department of Planning and Environment. https://webmap.environment.nsw.gov.au/Html5Viewer291/index.html?viewer=KoalaSEPP.htm5

DPE. (2022g). *NSW State Vegetation Type Map*. Department of Planning and Environment. https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet/state-vegetation-type-map

DPE. (2022h). *SEED Dataset and Mapping*. Department of Planning and Environment. https://www.seed.nsw.gov.au/

DPE. (2022i). *Soil Landscapes of Central and Eastern NSW - v2*. Department of Planning and Environment. https://www.environment.nsw.gov.au/eSpade2Webapp

EPA. (2014). *Waste Classification Guidelines*. Environmental Protection Agency. https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines

Harden, G. J. (1993a). *Flora of New South Wales Volume 3* (1st ed., Vol. 3). UNSW Press.

Harden, G. J. (1993b). *Flora of New South Wales Volume 4* (1st ed., Vol. 4). UNSW Press.

Harden, G. J. (2000). *Flora of New South Wales Volume 1* (G. J. (Gwenneth J. Harden (ed.); 2nd ed., Vol. 1). UNSW Press.

Harden, G. J. (2002). *Flora of New South Wales Volume 2* (2nd ed., Vol. 2). UNSW Press.

Landcom. (2004). *Managing Urban Stormwater: Soils and Construction* (Vol. 1). https://www.environment.nsw.gov.au/research-and-publications/publications-search/managing-urban-stormwater-soils-and-construction-volume-1-4th-editon

LLS. (2019). *Greater Sydney Regional Strategic Weed Management Plan 2017 - 2022*. Local Land Services.

National Herbarium of NSW. (2021). *PlantNET*. https://plantnet.rbgsyd.nsw.gov.au/

OEH. (2018). *Threatened Species Test of Significance Guidelines*. https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/threatened-species-test-significance-guidelines-170634.pdf

Richardson, Richardson, & Shepherd. (2011). *Weeds of the south-east : an identification guide for Australia* (3rd ed.). R.G. and F.J. Richardson.

Robinson, L. (2003). *Field guide to the native plants of Sydney*. Kangaroo Press.

Appendix A. Proposed Plans

DRAWING KEY

- Proposed on-ground trail
- Proposed elevated boardwalk
- 1 Sketch view
- Lookout view sheds

Boardwalk take off point

Boardwalk avoids access to dangerous edge of cliff

Retention of steep concrete steps connection to road

Small lookout providing ocean views and seating

Continued protection of sensitive mature coastal vegetation on steep banks

Boardwalk aligned to edge of native vegetation

Small lookout providing views over spectacular rocky coastal landscape

Boardwalk connection to existing trail and carpark

SOUTH PACIFIC OCEAN

LUMSDAINE DRIVE

CH 0

CH 50

CH 100

CH 150

1 SKETCH CONCEPT OF BOARDWALK ENTRY
The proposed elevated boardwalk diverges from the existing Curl Curl boardwalk and follows an existing desire line through low shrub vegetation. The boardwalk alignment is designed to provide visitors with a coastal experience that is safely set back from the cliff edge. Consideration of similar timber decking materials to match existing boardwalk or use FRP charcoal mini mesh for increased durability and grip.

2 SKETCH CONCEPT OF ELEVATED BOARDWALK THROUGH VEGETATION
Sensitvely designed elevated boardwalk is situated above and clear of the existing native vegetation supported on posts attached to the rock below, resulting in minimal impact to indigienous vegetation and the visual character of the area. The proposed alignment will traverse at a gentle gradient through an area of younger vegetation to avoid damaging mature native species in nearby steep coastal banks.

3 SKETCH CONCEPT OF ELEVATED BOARDWALK THROUGH VEGETATION
The gently graded elevated boardwalk would utilise carefully selected materials to blend into the coastal aesthetics of the site with minimal visual intrusion to the coastal landscape. Inspiration for material colours would be drawn from the natural landscape.

northern beaches council

CONCEPT DESIGN PLAN: ZONE 1

FRESHWATER HEADLAND & BEACH BOARDWALKS

FEBRUARY 2019
FB _CD_01
SHEET 1 OF 2
SCALE 1:400 @A1

Appendix B. Site photos

Figure 0-1. Northern aspect of the site.

Figure 0-2. Southern aspect of the site.

Appendix C. Flora Inventory

Table B- 1 Flora species identified on site during the two site surveys

Family	Exotic*	Scientific Name	Common Name	BC Act Status	EPBC Act Status
Fabaceae (Mimosoideae)		*Acacia longifolia*			
Fabaceae (Mimosoideae)		*Acacia myrtifolia*	Red-stemmed Wattle		
Polygonaceae	*	*Acetosa sagittata*	Rambling Dock		
Asteraceae	*	*Ageratina riparia*	Mistflower		
Casuarinaceae		*Allocasuarina distyla*			
Asparagaceae	*	*Asparagus aethiopicus*	Asparagus Fern		
Myrtaceae		*Baeckea imbricata*			
Proteaceae		*Banksia ericifolia*	Heath-leaved Banksia		
Proteaceae		*Banksia integrifolia*	Coast Banksia		
Myrtaceae		*Callistemon citrinus*	Crimson Bottlebrush		
Myrtaceae		*Callistemon linearis*	Narrow-leaved Bottlebrush		
Aizoaceae		*Carpobrotus glaucescens*	Pigface		
Commelinaceae		*Commelina cyanea*	Native Wandering Jew		
Asteraceae	*	*Conyza bonariensis*	Flaxleaf Fleabane		
Rutaceae		*Correa alba* var. *alba*	White Correa		
Sapindaceae		*Cupaniopsis anacardioides*	Tuckeroo		
Poaceae		*Cynodon dactylon*	Common Couch		
Dryopteridaceae	*	*Cyrtomium falcatum 'Rochfordii'*	Holly Fern		
Phormiaceae		*Dianella caerulea*	Blue Flax-lily		
Phormiaceae		*Dianella longifolia*	Blueberry Lily		
Poaceae		*Dichelachne crinita*	Longhair Plumegrass		
Convolvulaceae		*Dichondra repens*	Kidney Weed		
Poaceae	*	*Ehrharta erecta*	Panic Veldtgrass		
Cyperaceae		*Ficinia nodosa*	Knobby Club-rush		
Asteraceae	*	*Gamochaeta pensylvanica*	Cudweed		
Proteaceae		*Hakea gibbosa*			
Poaceae	*	*Holcus lanatus*	Yorkshire Fog		
Euphorbiaceae		*Homalanthus populifolius*			
Apiaceae	*	*Hydrocotyle bonariensis*			
Poaceae		*Imperata cylindrica*	Blady Grass		
Convolvulaceae	*	*Ipomoea indica*	Morning Glory		
Fabaceae (Faboideae)		*Kennedia rubicunda*	Dusky Coral Pea		
Verbenaceae	*	*Lantana camara*	Lantana		
Malvaceae		*Lasiopetalum ferrugineum*			

Myrtaceae		*Leptospermum laevigatum*	Coast Teatree		
Poaceae	*	*Lolium perenne*	Perennial Ryegrass		
Lomandraceae		*Lomandra confertifolia* subsp. *rubiginosa*			
Lomandraceae		*Lomandra longifolia*	Spiny-headed Mat-rush		
Fabaceae (Faboideae)	*	*Medicago* spp.			
Myrtaceae		*Melaleuca hypericifolia*	Hillock bush		
Myrtaceae	*	*Metrosideros excelsa*	New Zealand Christmas Bush		
Poaceae		*Microlaena stipoides*	Weeping Grass		
Ericaceae		*Monotoca elliptica*	Tree Broom-heath		
Myoporaceae		*Myoporum boninense* subsp. *australe*			
Alliaceae	*	*Nothoscordum borbonicum*	Onion Weed		
Geraniaceae		*Pelargonium australe*	Native Storksbill		
Pittosporaceae		*Pittosporum undulatum*	Sweet Pittosporum		
Poaceae	*	*Poa annua*	Winter Grass		
Poaceae	*	*Polypogon monspeliensis*	Annual Beardgrass		
Chenopodiaceae		*Rhagodia candolleana* subsp. *candolleana*			
Polygonaceae	*	*Rumex obtusifolius*	Broadleaf Dock		
Solanaceae	*	*Solanum nigrum*	Black-berry Nightshade		
Asteraceae	*	*Soliva sessilis*	Bindyi		
Asteraceae	*	*Sonchus asper*	Prickly Sowthistle		
Asteraceae	*	*Sonchus oleraceus*	Common Sowthistle		
Poaceae		*Sporobolus virginicus*			
Caryophyllaceae	*	*Stellaria media*	Common Chickweed		
Poaceae	*	*Stenotaphrum secundatum*	Buffalo Grass		
Menispermaceae		*Stephania japonica*	Snake vine		
Asteraceae	*	*Taraxacum officinale*	Dandelion		
Aizoaceae		*Tetragonia tetragonioides*	New Zealand Spinach		
Lamiaceae		*Westringia fruticosa*	Coastal Rosemary		
Poaceae		*Zoysia* spp.			

BC Act Status: V – Vulnerable, E1 - Endangered, E4A - Critically Endangered, P – Protected, 2 – Category 2 sensitive species, 3 - Category 3 sensitive species

EPBC Act Status: X = Extinct, CE - Critically Endangered, E – Endangered, V – Vulnerable.

Appendix D. Fauna Inventory

Table C- 1 Fauna species identified on site during the site survey on the 24th of August 2022

Family	Exotic*	Scientific Name	Common Name	BC Act Status	EPBC Act Status
Sturnidae	*	*Acridotheres tristis*	Common Myna		
Meliphagidae		*Anthochaera carunculata*	Red Wattlebird	P	
Psittacidae		*Trichoglossus haematodus*	Rainbow Lorikeet	P	
Accipitridae		*Pandion cristatus*	Eastern Osprey	V,P,3	
Maluridae		*Malurus cyaneus*	Superb Fairy-wren	P	
Scincidae		*Tiliqua scincoides*	Eastern Blue-tongue	P	

BC Act Status – V – Vulnerable, E1 Endangered, E4A - Critically Endangered, P – Protected, 2 – Category 2 sensitive species, 3 - Category 3 sensitive species
EPBC Act Status - CE - Critically Endangered, E – Endangered, V – Vulnerable, C – Camba, J – Jamba, K – Rokamba

Appendix E. Weed Species listed as a Biosecurity Risk

Table D -1 Categories of Management under the Greater Sydney Regional Strategic Weed Management Plan 2017-2022 (LLS 2021) under the *NSW Biosecurity Act 2015*

Category	Management Action
Prevention (Prevent)	To prevent the weed species arriving and establishing in the Region.
Eradication (Eliminate)	To permanently remove the species and its propagules from the Region, OR to destroy infestations to reduce the extent of the weed in the region with the aim of local eradication.
Containment (Minimise)	To prevent the ongoing spread of the species in all or part of the Region.
Asset Protection (Manage)	To prevent the spread of weeds to key sites/ assets of high economic, environmental and social value, or to reduce their impact on these sites if spread.
GBD (General Biosecurity Duty)	All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable."
RRM (Regional Recommended Measure)	Specific details for each species included in Table E-2, relevant.
PoD (Prohibition on Dealings)	Must not be imported into the State or sold.
B Zone (Biosecurity Zone)	Specific details for each species included in Table E-2, as relevant.
PM (Prohibited Matter)	A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries.

Table D-0-1.Weeds under the Biosecurity Act recorded within the subject site listed as State or Regional Priority Weeds in the Greater Sydney Regional Strategic Weed Management Plan 2017-2022 (LLS 2021)

Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds-Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Weed Control Technique	Herbicide Application	Herbicide Group	Ratio	Duties for Priority Weeds of Greater Sydney
Lantana	*Lantana camara*	Yes	Asset Protection			Cut and paint, sprayed or splattered with Glyphosate	Glyphosate 360g/L	M	Neat	PoD
Asparagus Fern	*Asparagus aethiopicus*	Yes				Small single specimens to be crowned or Sprayed with Glyphosate/metsulfuron methyl	Glyphosate 360g/L & Metsulfuron-Methyl 600 g/kg	M & B	1/100 & 1g/10L	PoD
Morning Glory	*Ipomoea indica*				Environment, Human health	Small single specimens hand pulled, skirting larger vines scraping and painting with neat Glyphosate	Glyphosate 360g/L	M	Neat	
Mistflower	*Ageratina riparia*				Environment, Agriculture	Hand removal, brush cut and foliar sprayed with Glyphosate	Glyphosate 360g/L	M	1/100	
Rambling Dock	*Acetosa sagittata*				Environment	Juvenile single specimens to be dug out. Large infestations foliar spraying with Glyphosate.	Glyphosate 360g/L	M	1/100	
Yorkshire Fog	*Holcus lanatus*				Environment	Hand removal or spot sprayed.	Glyphosate 360g/L		1/200	
Flaxleaf Fleabane	*Conyza bonariensis*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L	M	1/100	
Holly Fern	*Cyrtomium falcatum 'Rochfordii'*					Hand removal or spot sprayed.	Glyphosate 360g/L	M	1/50	
Panic Veldtgrass	*Ehrharta erecta*					Hand removal or foliar spraying with Glyphosate for infestations.	Glyphosate 360g/L	M	1/100	

Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds-Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Weed Control Technique	Herbicide Application	Herbicide Group	Ratio	Duties for Priority Weeds of Greater Sydney
Cudweed	*Gamochaeta pensylvanica*					Hand removal or spot sprayed.	Glyphosate 360g/L	M	Neat	
	Hydrocotyle bonariensis					Hand pulled or spot sprayed with Dicamba				
Perennial Ryegrass	*Lolium perenne*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L	M	1/100	
	Medicago spp.					Foliar spraying with Glyphosate	Glyphosate 360g/L	M	1/100	
New Zealand Christmas Bush	*Metrosideros excelsa*									
Onion Weed	*Nothoscordum borbonicum*					Juvenile single specimens to be dug out. Large infestations foliar spraying with Glyphosate.	Glyphosate 360g/L	M	1/100	
Winter Grass	*Poa annua*					Foliar spraying with Glyphosate	Glyphosate 360g/L		1/100	
Annual Beardgrass	*Polypogon monspeliensis*					Foliar spraying with Glyphosate	Glyphosate 360g/L		1/101	
Broadleaf Dock	*Rumex obtusifolius*					Hand removed, cut and painted, or spot sprayed.	Glyphosate 360g/L	M	1/100 & Neat	
Black-berry Nightshade	*Solanum nigrum*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L	M	1/100	
Bindyi	*Soliva sessilis*						Glyphosate 360g/L		1/100	
Prickly Sowthistle	*Sonchus asper*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L	M	1/100	

Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds-Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Weed Control Technique	Herbicide Application	Herbicide Group	Ratio	Duties for Priority Weeds of Greater Sydney
Common Sowthistle	*Sonchus oleraceus*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L	M	1/100	
Common Chickweed	*Stellaria media*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L	M	1/100	
Buffalo Grass	*Stenotaphrum secundatum*					Foliar spraying with Glyphosate	Glyphosate 360g/L		1/100	
Dandelion	*Taraxacum officinale*					Foliar spraying with Glyphosate	Glyphosate 360g/L		1/100	

Appendix F. Threatened Flora Likelihood of Occurrence

Table E-1. The likelihood of flora species that have been deemed threatened under the *BC Act 2016* and/or the *EPBC Act 1999* to occur on site.

Note: 'recent' records refer to records in the last 10 years.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Acacia bynoeana	Bynoe's Wattle	E1	V	Occurs in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple. Found in central eastern NSW from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Currently known from about 30 locations with the size of the populations at most locations being very small (1-5 plants). Has recently been found in the Colymea and Parma Creek areas west of Nowra.	**Low:** Not detected during current survey. Three old records of species occurrence found within 5km of the site. Some habitat associations present on site.
Acacia terminalis* subsp. *terminalis	Sunshine Wattle	E1	E	Distribution & Ecology: Very limited distribution in the eastern suburbs of Sydney. Occurs in coastal scrub and dry sclerophyll woodland on sandy soils . Habitat is generally sparse and scattered. Most areas of habitat or potential habitat are small and isolated, and disturbed due to surrounding urban development.	**Low:** Not detected during current survey. There are 167 recorded occurrences within 5km of the site with 11 of these being recent records (within the last 10years). No habitat associations present on site.
Allocasuarina portuensis	Nielsen Park She-oak	E1,3	E	The original habitat is tall closed woodland. Canopy species include: *Ficus rubiginosa, Angophora costata, Elaeocarpus reticulatus* and *Gloichidion ferdinandi* with a shrub layer of *Pittosporum revolutum, Kunzea ambigua* and *Monotoca elliptica*. The original habitat occurs above a sandstone shelf approximately 20 m above the harbour. The shallow sandy soils are highly siliceous, coarsely textured	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

				and devoid of a soil profile. The plantings have occurred on similar soils.	
Asterolasia elegans		E1	E	Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby local government areas. Also likely to occur in the western part of Gosford local government area. Known from only seven populations, only one of which is wholly within a conservation reserve. Habitat and ecology: Occurs on Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. The canopy at known sites includes Turpentine (*Syncarpia glomulifera subsp. glomulifera*), Smooth-barked Apple (*Angophora costata*), Sydney Peppermint (*Eucalyptus piperita*), Forest Oak (*Allocasuarina torulosa*) and Christmas Bush (*Ceratopetalum gummiferum*). Ecological knowledge about this species is very limited.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Caladenia tessellata	Thick Lip Spider Orchid	E1,P,2	V	The Thick Lip Spider Orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Populations in Kiama and Queanbeyan are presumed extinct. It was also recorded in the Huskisson area in the 1930s. The species occurs on the coast in Victoria from east of Melbourne to almost the NSW border. Habitat and ecology: Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. The single leaf regrows each year.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Callistemon linearifolius	Netted Bottle Brush	V,3		Distribution & Ecology: Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. Grows in dry sclerophyll forest on the coast and adjacent ranges. Recorded in 2000 at Coalcliff in the northern Illawarra. For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River. The species was more widespread in the past, and there are currently only 5-6 populations remaining from the 22 populations historically recorded in the Sydney area. Three of the remaining populations are reserved in Ku-ring-gai Chase National Park, Lion Island Nature Reserve and Spectacle Island Nature Reserve. The species has also been recorded from Yengo National Park. Flowering & Reproduction: spring – summer.	**Low:** Not detected during current survey. Two new records of species occurrence found within 5km of the site. No habitat associations present on site.

Chamaesyce psammogeton	Sand Spurge	E1		Found sparsely along the coast from south of Jervis Bay (at Currarong, Culburra and Seven Mile Beach National Park) to Queensland (and Lord Howe Island). Populations have been recorded in Wamberal Lagoon Nature Reserve, Myall Lakes National Park, Moonee Beach Nature Reserve and Bundjalung National Park. Grows on fore-dunes, pebbly strandlines and exposed headlands, often with Spinifex (*Spinifex sericeus*) and Prickly Couch (*Zoysia macrantha*)..	**Extremely Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. No habitat associations present on site.
Cryptostylis hunteriana	Leafless Tongue Orchid	V,P,2	V	The Leafless Tongue Orchid has been recorded from as far north as Gibraltar Range National Park south into Victoria around the coast as far as Orbost. It is known historically from a number of localities on the NSW south coast and has been observed in recent years at many sites between Batemans Bay and Nowra (although it is uncommon at all sites). Also recorded at Nelson Bay, Wyee, Washpool National Park, Nowendoc State Forest, Ku-Ring-Gai Chase National Park and Ben Boyd National Park. The Leafless Tongue Orchid occurs mainly in coastal districts, from the Gibralter Range National Park in the north to Orbost in Victoria in the south. The Leafless Tongue-orchid has been reported to occur in a wide variety of habitats including heathlands, heathy woodlands, sedgelands, Xanthorrheoa spp. plains, dry sclerophyll forests (shrub/grass sub-formation and shrubby sub-formation), forested wetlands, freshwater wetlands, grasslands, grassy woodlands, rainforests and wet sclerophyll forests (grassy sub-formation). The larger populations typically occur in woodland dominated by Scribbly Gum (Eucalyptus sclerophylla), Silvertop Ash (E. sieberi), Red Bloodwood (Corymbia gummifera) and Black Sheoak (Allocasuarina littoralis); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (C. subulata) and the Tartan Tongue Orchid (C. erecta). Soils are generally considered to be moist and sandy, however, this species is also known to grow in dry or peaty soils	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

Cynanchum elegans	White-flowered Wax Plant	E1	E	Restricted to eastern NSW where it is distributed from Brunswick Heads on the north coast to Gerroa in the Illawarra region. The species has been recorded as far west as Merriwa in the upper Hunter River valley. White-flowered Wax Plant occurs on a variety of lithologies and soil types, usually on steep slopes with varying degrees of soil fertility (Quinn et al. 1995). Geology is not a limiting factor for this species and associated substrate varies at different locations. This species occurs from near sea level to about 600 m above sea level and experiences hot humid summers with high summer-autumn rainfall, and cool winters with low spring rainfall. Annual average rainfall ranges from 700–1450 mm (Matthes & Nash 1993; Quinn et al. 1995). The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree *Leptospermum laevigatum* – Coastal Banksia *Banksia integrifolia subsp. integrifolia* coastal scrub; Forest Red Gum *Eucalyptus tereticornis* aligned open forest and woodland; Spotted Gum *Corymbia maculata* aligned open forest and woodland; and Bracelet Honeymyrtle *Melaleuca armillaris* scrub to open scrub.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Darwinia biflora		V	V	Distribution & Ecology: Recorded in Kuringai, Hornsby, Baulkham Hills and Ryde LGAs. It occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone. The vegetation structure is usually woodland, open forest or scrub-heath.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Epacris purpurascens* var. *purpurascens		V		Distribution & Ecology: Recorded from Gosford in the north, to Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the South. Found in a range of habitat types, most of which have a strong shale soil influence.	**Low**: Not detected during current survey. One old record of species occurrence found within 5km of the site. Some habitat associations present on site

Eucalyptus camfieldii	Camfield's Stringybark	V	V	Distribution & Ecology: Restricted distribution in a narrow band with the most northerly records in the Raymond Terrace area south to Waterfall. Poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges. Occurs mostly in small scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas.	**Moderate:** Not detected during current survey. One new record of species occurrence found within 5km of the site. Habitat associations present on site.
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	This species is sparsely distributed but widespread on the New England Tablelands from Nundle to north of Tenterfield, being most common in central portions of its range. Found largely on private property and roadsides, and occasionally in conservation reserves. Planted as urban trees, windbreaks and corridors. Habitat and ecology: Typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock.	**Low:** Not detected during current survey. Four old records of species occurrence found within 5km of the site. Some habitat associations present on site
Genoplesium baueri	Bauer's Midge Orchid	E1,P,2	E	The species has been recorded from locations between Ulladulla and Port Stephens. About half the records were made before 1960 with most of the older records being from Sydney suburbs including Asquith, Cowan, Gladesville, Longueville and Wahroonga. No collections have been made from those sites in recent years. Currently the species is known from just over 200 plants across 13 sites. The species has been recorded at locations now likely to be within the following conservation reserves: Berowra Valley Regional Park, Royal National Park and Lane Cove National Park. May occur in the Woronora, O'Hares, Metropolitan and Warragamba Catchments. Habitat and ecology: Grows in dry sclerophyll forest and moss gardens over sandstone. In the Ku-ring-gai Wildflower Garden, the species ocupies damn soils dominated by sedges and rushes such as Gahnia sp.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

Haloragodendron lucasii		E1	E	The known locations of this species are confined to a very narrow distribution on the north shore of Sydney. Associated with dry sclerophyll forest. Reported to grow in moist sandy loam soils in sheltered aspects, and on gentle slopes below cliff-lines near creeks in low open woodland. Associated with high soil moisture and relatively high soil-phosphorus levels. Highly clonal, which implies the true population size may be considerably smaller than expected.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Lasiopetalum joyceae		V	V	Distribution & Ecology: Grows in heath on sandstone. Has a restricted range occurring on lateritic to shaley ridgetops on the Hornsby Plateau south of the Hawkesbury River. It is currently known from 34 sites between Berrilee and Duffys Forest. Seventeen of these are reserved. Grows in heath on sandstone.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Melaleuca biconvexa	Biconvex Paperbark	V	V	Distribution & Ecology: Generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. Only found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north.	**Extremely Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on site
Melaleuca deanei	Deane's Paperbark	V	V	The species occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone. Flowers appear in summer but seed production appears to be small and consequently the species exhibits a limited capacity to regenerate. Two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas respectively. There are also more isolated occurrences at Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas.	**Moderate:** Not detected during current survey. One new record of species occurrence found within 5km of the site. Habitat associations present on site.
Persicaria elatior	Tall Knotweed	V	V	Tall Knotweed has been recorded in south-eastern NSW (Mt Dromedary (an old record), Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW it is known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). The species also occurs in Queensland. This species normally grows in damp places, especially beside	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

				streams and lakes. Occasionally in swamp forest or associated with disturbance.	
Persoonia hirsuta	Hairy Geebung	E1,P,3	E	Distribution & Ecology: Has a scattered distribution around Sydney from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. Has a large area of occurrence but occurs in small populations. Found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone. It is usually present as isolated individuals or very small populations.	**Low:** Not detected during current survey. Three old records of species occurrence found within 5km of the site. Some habitat associations present on site
Pimelea curviflora* var. *curviflora		V	V	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Flowers October to May. Has an inconspicuous cryptic habit as it is fine and scraggly and often grows amongst dense grasses and sedges. It may not always be visible at a site as it appears to survive for some time without any foliage after fire or grazing, relying on energy reserves in its tuberous roots. Confined to the coastal area of the Sydney and Illawarra regions. Formerly recorded around the Parramatta River and Port Jackson region including Five Dock, Bellevue Hill and Manly.	**Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. Some degraded habitat associations present on site.
Prostanthera densa	Villous Mint-bush	V	V	Distribution & Ecology: Generally grows in sclerophyll forest and shrubland on coastal headlands and near coastal ranges, chiefly on sandstone, and rocky slopes near the sea. This species has been recorded from the Currarong area in Jervis Bay, Royal National Park (Marley), Cronulla, Helensburgh and Port Stephens (Nelson Bay). The Sydney and Royal National Park populations were thought possibly extinct, but the species is now known to occur at Bass and Flinders Point in Cronulla.	**Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. Some habitat associations present on site.

Prostanthera junonis	Somersby Mintbush	E1	E	Distribution & Ecology: Has a north-south range of approximately 19km on the Somersby Plateau in the Gosford and Wyong local government areas. Occurs on both the Somersby and Sydney Town soil landscapes on gently undulating country over weathered Hawkesbury sandstone within open forest/low woodland/open scrub. Occurs in both disturbed and undisturbed sites.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Prostanthera marifolia	Seaforth Mintbush	E4A,3	CE	Only known from the northern Sydney suburb near Seaforth and has a very highly restricted distribution within the Sydney Basin Bioregion. Total number of populations may be as few as one and fragmented by urbanisation into as few as three small sites. Occurs in localised patches in or in close proximity to the endangered Duffys Forest ecological community. Some plants are located on deeply weathered clay-loam soils associated with ironstone and scattered shale lenses, a soil type which only occurs on ridge tops and has been extensively urbanised.	**Low:** Not recorded during current survey. There are 107 recorded occurrences within 5km of the site with 67 of these being recent records (within the last 10years). The most recent record, from 2022, is 4km away and all records are clumped together in this singular area. No habitat associations present on site.
Rhizanthella slateri	Rhizanthella slateri (Rupp) M.A. Clem. & Cribb in the Great Lakes local government area	E2,V,P,2	E	Rhizanthella slateri is restricted to New South Wales where it is currently known from 14 populations including Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. The Rhizanthella slateri population in the Great Lakes Local Government Area (LGA) occurs at the known northern limit of the species' range and is disjunct from other known populations of the species. Habitat and ecology: Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Rhodamnia rubescens	Scrub Turpentine	E4A		Distribution & Ecology: Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on	**Extremely Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on site

				volcanic and sedimentary soils. Flowering & Reproduction: late winter to spring. Flowers August to October, fruit October to December. Notable threats: Myrtle Rust (Austropuccinia psidii).	
Rhodomyrtus psidioides	Native Guava	E4A		Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW. Habitat and ecology Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is characterised being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Senecio spathulatus	Coast Groundsel	E1		Coast Groundsel grows on frontal dunes. Coast Groundsel occurs in Nadgee Nature Reserve (Cape Howe) and between Kurnell in Sydney and Myall Lakes National Park (with a possible occurrence at Cudmirrah). In Victoria there are scattered populations from Wilsons Promontory to the NSW border.	**Extremely Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on site
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	Naturally found only in NSW in a narrow, linear coastal strip from Bulahdelah to Conjola State Forest. On the south coast occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	**Low:** Not detected during current survey. There are 30 recorded occurrences within 5km of the site with 12 of these being recent records (within the last 10years). No habitat associations present on site.

Tetratheca glandulosa		V		Distribution & Ecology: Restricted to the following LGAs: Baulkham Hills, Gosford, Hawkesbury, Hornsby, Ku-ring-gai, Pittwater, Ryde, Warringah, and Wyong. Associated with shale-sandstone transition habitat where shale-cappings occur over sandstone. Occupies ridgetops, upper-slopes and to a lesser extent mid-slope sandstone benches. Soils are generally shallow, consisting of a yellow, clayey/sandy loam. Vegetation structure varies from heaths and scrub to woodlands/open woodlands, and open forest.	**Moderate:** Not recorded during current survey. There are 31 recorded occurrences within 5km of the site with 23 of these being recent records (within the last 10years). The most recent record, from 2019, is 5km away and all records are clumped together in this singular area. Some degraded habitat associations present on site.
Thesium australe	Austral Toadflax	V	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. It is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. Often found in association with Kangaroo Grass (*Themeda australis*) and often hidden amongst grasses and herbs.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

Appendix G. Threatened Fauna Likelihood of Occurrence

Table F-1. The likelihood of fauna species that have been deemed threatened under the *BC Act 2016* and/or the *EPBC Act 1999* to occur on site.

Note: 'recent' records refer to records in the last 10 years.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Actitis hypoleucos	Common Sandpiper	P	C,J,K	The Common Sandpiper mainly breeds in parts of Europe and Asia, and occasionally Africa. The population that migrates to Australia breeds in the Russian far east. European breeding birds rarely remain in Europe during the non-breeding period, with individuals moving to Africa and Asia. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags. Generally the species forages in shallow water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots. Birds sometimes venture into grassy areas adjoining wetlands. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves. The species is known to perch on posts, jetties, moored boats and other artificial structures, and to sometimes rest on mud or 'loaf' on rocks.	**Extremely Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on the subject site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Anous stolidus	Common Noddy	P	C,J	Distribution: In Australia, the Common Noddy occurs mainly in ocean off the Queensland coast, but the species also occurs off the north-west and central Western Australia coast, Norfolk, Lord Howe, Christmas and Cocos-Keeling Islands and off the coast of the Northern Territory, where only one breeding location with about 100-130 birds is known. Outside of Australia, the Common Noddy is widespread in tropical and subtropical seas and land masses. Habitat: During the breeding season, the Common Noddy usually occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand. When not at the nest, individuals will remain close to the nest, foraging in the surrounding waters. Birds may nest in bushes, saltbush, or other low vegetation. They may also nest on the ground in Pigface (Carpobrotus spp.) or grass, on bare rock and on tree-stumps. On Lord Howe, Kermadec and Christmas Islands, many nests are built on cliff ledges. Although the species is quite flexible in regards to nesting locations, pairs appear to select nesting habitat based on a hierarchy of preference. Foraging: The Common Noddy feeds mainly during the day on fish, although they are known to feed on molluscs, aquatic insects and even Screw Pine (Pandanus spp.) fruit.	**Low:** Not detected during current survey. Four old records of species occurrence found within 5km of the site. Some degraded habitat associations present on site
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE	Distribution & Ecology: North-eastern Victoria to south-east Queensland. Mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Also found in drier coastal woodlands and forests. Foraging: A generalist forager, which mainly feeds on the nectar from a wide range of eucalypts and mistletoes. Insects make up 15% of diet. Breeding: between July and January. There are only three known key breeding regions remaining: two of which are in NSW at Capertee Valley, and the Bundarra-Barraba region. Nesting: in horizontal branches or forks in tall mature Eucalypts and sheoaks, and also in mistletoe haustoria. Relevant threats: Competition from larger	**Extremely Low:** Not detected during current survey. Two old records of species occurrence found within 5km of the site. No habitat associations present on site

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				aggressive honeyeaters, particularly Noisy Miners, Noisy Friarbirds and Red Wattlebirds.	
Apus pacificus	Fork-tailed Swift	P	C,J,K	Summer migrant, October to April. Mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. Also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes and sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. In NSW, the Fork-tailed Swift is recorded in all regions. Foraging: Almost exclusively aerial, flying from less then 1 m to at least 300 m above ground and probably much higher. In flocks, rarely one or two individuals. Sleeps in high circling flocks. Breeding: Siberia to Japan and Asia.	**Extremely Low:** Not detected during current survey. Three old records of species occurrence found within 5km of the site. No habitat associations present on site
Arctocephalus pusillus doriferus	Australian Fur-seal	V,P		Reported to have bred at Seal Rocks, near Port Stephens and Montague Island in southern NSW. Haul outs are observed at isolated places along the NSW coast. Prefers rocky parts of islands with flat, open terrain. They occupy flatter areas than do New Zealand Fur-seals where they occur together.	**Low**: Not detected during current survey. Two new records of species occurrence found within 5km of the site. No habitat associations present on site.
Ardenna carneipes	Flesh-footed Shearwater	V,P	J,K	Distribution & Ecology: pelagic birds, they are locally common visitors to waters of the continental shelf and continental slope off southern Australia and around Lord Howe Island, and occasionally over inshore waters. Individuals also pass through the tropics and over deeper waters when on migration. They range throughout the Pacific and Indian Oceans. There are two main breeding areas in the world: one in the South West Pacific that includes Lord Howe Island and New Zealand; the other along the coast of Western Australia. Breeding: Eggs are laid in burrows 1-2 metres in length. Within the Sydney Metro area they are found within marine waters from September to May. Foraging: mainly over sea, rarely on land, for small fish, cephalopod molluscs, crustaceans, other soft bodied invertebrates, and offal. Techniques employed include surface plunging, pursuit plunging, surface seizing and diving, pursuit diving, and pattering. nets on Lord Howe Island in forests	**Extremely Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				on sandy soils from Ned's Beach to Clear Place, with smaller colonies below Transit Hill and at Old Settlement Beach.	
Ardenna grisea	Sooty Shearwater	P	J	The Sooty Shearwater forages in pelagic (open ocean) sub-tropical, sub-Antarctic and Antarctic waters. The species migrates and forages in the North Pacific and Atlantic Oceans during the non-breeding season. Sooty Shearwaters may forage inshore occasionally, especially during rough weather. In Australian waters, the Sooty Shearwater has been recorded in areas with sea surface-temperatures of 8.7-22.0° C. The Sooty Shearwater breeds mainly on subtropical and sub-Antarctic islands, as well as on the mainland of New Zealand. Birds nest in burrows or rock crevices on coastal slopes, ridges and cliff tops, in herbfields, tussock grassland or forest. The Sooty Shearwater breeds mainly on subtropical and sub-Antarctic islands, as well as on the mainland of New Zealand. Birds nest in burrows or rock crevices on coastal slopes, ridges and cliff tops, in herbfields, tussock grassland or forest. Areas with waterlogged or shallow soils and/or dense vegetation are avoided.	**Extremely Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. No habitat associations present on site.
Ardenna pacifica	Wedge-tailed Shearwater	P	J	Distribution & Ecology: a pelagic, marine bird known from tropical and subtropical waters. It is widespread across the Indian and Pacific Oceans. Breeding: In summer, on the east and west coasts of Australia and on off-shore islands. Common in the Indian Ocean, the Coral Sea and the Tasman Sea. Areas where breeding occurs include islands off the west coast of WA, islands and cays of the Great Barrier Reef (Queensland), and islands along the eastern coast of eastern Australia, including Lord Howe Island and Norfolk Island (NSW). Foraging: have been observed feeding along the junction between inshore and offshore water masses in Australia. In tropical waters, they mainly forage over cool nutrient-rich waters and associated upwellings. Roosting: mainly excavated burrows on flat or flattish areas with dense grassy and tussocky vegetation. This can vary depending on the nature of soil and terrain, as at some sites burrows are below the cover of trees and shrubs. In deep soft soil, burrows can be 2+ metres long. At sites with sandy vegetated screes or stable dunes or on flats	**Low**: Not detected during current survey. Three new records of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				of shell grit, burrows are approximately to 1.5 m long, parallel with the surface or steeply dipping).	
Ardenna tenuirostris	Short-tailed Shearwater	P	C,J,K	Distribution & Ecology: most common shearwater along the south and south-east coasts of Australia in summer months. Enormous flocks of birds head south to breeding grounds off these coasts as they return from wintering grounds in the North Pacific. It is a migratory species that breeds mainly on small islands in Bass Strait and Tasmania and migrates to the Northern Hemisphere for the boreal summer. Foraging: krill, small fish and other small marine creatures. Food is caught mostly on the surface of the water but sometimes birds are seen diving for food. Breeding: They establish massive breeding colonies off the southern and south-eastern coasts of Australia each year. Off the coast of Tasmania, colonies can contain over 16 million adults and other colonies in Victoria and New South Wales hold a further two million or more. Roosting: Birds arrive at the colonies during the night. The nest is a leaf-lined chamber at the end of a burrow in the ground.	**Low**: Not detected during current survey. There are 38 records found within 5km of this site for this species and sixteen of these are within the last 10 years. However, no habitat associations present on site.
Arenaria interpres	Ruddy Turnstone	P	C,J,K	Distribution & Ecology: widespread within Australia during its non-breeding period of the year, including from Tasmania to Darwin and many coastal areas in between. Found in most coastal regions, with occasional records of inland populations. It strongly prefers rocky shores or beaches where there are large deposits of rotting seaweed. Foraging: mainly on the foreshore, between strand-line and wave zone, often amongst banks of stranded seawwed or other tide-wrack. They eat insects, worms, crustaceans, molluscs and spiders. Breeding: mid-may to early July, on the coasts of Europe, Asia, and North America. Nesting: on the ground in a small depression, lined with plant material.	**Low**: Not detected during current survey. Five new records of species occurrence found within 5km of the site. However, no habitat associations present on site
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		Distribution & Ecology: Widespread in eastern, southern, and south-western Australia. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. Also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found	**Low**: Not detected during current survey. One old record of species occurrence found within 5km of the site. Some habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				in farmland, usually at the edges of forest or woodland. Foraging: Primarily eats invertebrates, which are captured whilst hovering or sallying above the canopy. Breeding: August to January. Generally breed in solitary pairs. Nest is a scanty of twigs, 1-20m high on a horizontal branch/fence post. Relevant threats: Aggressive exclusion by over abundant noisy miners.	
Botaurus poiciloptilus	Australasian Bittern	E1,P	E	Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. They favour permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleoacharis spp.).Australasian Bitterns hide during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. The species requires shallow water, less than 30 cm deep with medium to low density reeds, grasses or shrubs for foraging and needs deeper water, with medium to high density reeds, rushes or sedges for nesting (Pickering 2013). Nests are built in secluded places in densely-vegetated wetlands on a platform of reeds, and there are usually six olive-brown eggs to a clutch.	**Extremely Low:** Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Burhinus grallarius	Bush Stone-curlew	E1,P		Distribution & Ecology: Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Behaviour: Largely nocturnal, being especially active on moonlit nights. Foraging: Feed on insects and small vertebrates, such as frogs, lizards and snakes. Breeding: August – January on the ground in a scrape or small bare patch.	**Low:** Not detected during current survey. There are 10 recorded occurrences with only one of these being recent records (within the last 10years). No vegetation associations present on site.
Calidris acuminata	Sharp-tailed Sandpiper	P	C,J,K	Distribution & Ecology: spends the non-breeding season in Australia. Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal (freshwater and saline) habitats. They are widespread in most	**Moderate:** Not detected during current survey. One new record of

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				regions of New South Wales (NSW) and Victoria, especially in coastal areas. They prefer muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry as well as intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. Breeding: May to September in Northern Siberia, in flocks of less that a thousand. The majority of the world population occurs in Australia in the nonbreeding season. Roosting: Roosting occurs at the edges of wetlands, on wet open mud or sand, in shallow water, or in short sparse vegetation, such as grass or saltmarsh. Occasionally, they roost on sandy beaches, stony shores or on rocks in water. They have also been recorded roosting in mangroves. Foraging: at the edge of the water of wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water. They also forage among inundated vegetation of saltmarsh, grass or sedges. They forage in sewage ponds, and often in hypersaline environments. After rain, they may forage in paddocks of short grass, well away from water. They may forage on coastal mudflats at low tide, and move to freshwater wetlands near the coast to feed at high tide.	species occurrence found within 5km of the site. Some habitat associations present on site.
Calidris alba	Sanderling	V,P	C,J,K	Distribution & Ecology: occurs in coastal areas around Australia. Inland records are sporadic and probably due to migration. Almost always found on the coast, mostly on open sandy beaches exposed to open sea-swell, and also on exposed sandbars and spits, and shingle banks, Foraging: in the wave-wash zone and amongst rotting seaweed. Breeding: Greenland, Canada and Siberia, usually on open ground, sometimes on raised hummocks or ridges. Roosting: on or behind bare sand high on the beach, clumps of washed-up kelp, coastal dunes, rocky reefs and ledges.	**Low:** Not detected during current survey. There are eight recorded occurrences within 5km of the site with only one of these being recent records (within the last 10years). No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Calidris canutus	Red Knot	P	E,C,J,K	Distribution & Ecology: Inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps or inland lakes. Foraging: usually in soft substrate near the edge of water on intertidal mudflats or sandflats exposed by low tide. At high tide they may feed at nearby lakes, sewage ponds and floodwaters. They probe rapidly in soft sand and mud for worms, bivalves and crustaceans and also eat spiders, insects, seeds and shoots. They feed by day and night, regulated by the tide. Roosting: on sandy beaches, spits and islets, and mudflats; in open areas far away from potential cover for predators, but close to feeding grounds. Breeding: in the far northern hemisphere, in scattered single pairs. The nest is a shallow depression on open ground, lined with grass and lichen. The eggs are blotched and speckled for camouflage.	**Extremely Low:** Not detected during current survey. Two old records of species occurrence found within 5km of the site. No habitat associations present on site
Calidris ferruginea	Curlew Sandpiper	E1,P	CE,C,J,K	Distribution & Habitat: Most of the Australian coastline (including Tasmania). Occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. Generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. Also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. Breeding: In Siberia and migrates to Australia (as well as Africa and Asia) for the non-breeding period, arriving in Australia between August and November, and departing between March and mid-April. Foraging: In or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. Omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds. Roosting: On shingle, shell or sand beaches; spits	**Extremely Low:** Not detected during current survey. Three old records of species occurrence found within 5km of the site. No habitat associations present on site

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores.	
Calidris melanotos	Pectoral Sandpiper	P	J,K	In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum. They forage in shallow water or soft mud at the edge of wetlands. The Pectoral Sandpiper is omnivorous, consuming algae, seeds, crustaceans, arachnids and insects. While feeding, they move slowly, probing with rapid strokes. They walk slowly on grass fringing water. The Pectoral Sandpiper is found in Australia from September to June (Higgins & Davies 1996). The species is very similiar in shape to the Sharp-tailed Sandpiper (Calidris acuminata) but with a slightly slimmer, longer neck, more rounded crown, a lower more sloping forehead, slightly shorter legs and a slightly longer and more strongly decurved bill.	**Extremely Low:** Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Calidris ruficollis	Red-necked Stint	P	C,J,K	Distribution & Habitat: along most of the Australian coastline with large densities on the Victorian and Tasmanian coasts. Recorded in all coastal regions, and found inland in all states when conditions are suitable. Mostly found along the shoreline in coastal areas like bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks, They also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in saltflats. They sometimes use flooded paddocks or damp grasslands, and occasionally dry gibber plains. Habitat loss is the biggest major threat in Australia. Breeding: Siberia and sporadically in north and west Alaska. From August to April, over 80% of the global population resides in Australia with smaller numbers in New Guinea and New Zealand. Foraging: omnivorous, foraging on intertidal and	**Low:** Not detected during current survey. There are 26 recorded occurrences within 5km of the site with four of these being recent records (within the last 10years). No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				near-coastal wetlands, and other areas with a film of surface water. It jabs and probes with its bill into the soft mud for small invertebrates. It also forages on plant seeds and a range of insects. They sometimes feeds in dense flocks that spread out as the tide recedes. They often feed with other species, especially Sharp-tailed Sandpipers and Curlew Sandpipers. Roosting: on sheltered beaches, spits, banks or islets, of sand, mud, coral or shingle, sometimes in saltmarsh or other vegetation. Occasionally on exposed reefs and ocean beaches. Also roost among beachcast seaweed or clods of mud or dried cow-pats. During very high tides they may use sand dunes or claypans.	
Calidris tenuirostris	Great Knot	V,P	CE,C,J,K	Distribution & Ecology: In NSW, the species has been recorded at scattered sites along the coast down to about Narooma. It has also been observed inland at Tullakool, Armidale, Gilgandra and Griffith. Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Breeding: Migrates to Australia from late August to early September, although juveniles may not arrive until October-November. Most birds return north in March and April, however some individuals may stay over winter in Australia. Foraging: by methodically thrusting its bill deep into the mud to search for invertebrates, such as bivalve molluscs, gastropods, polychaete worms and crustaceans. Roosting: on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms.	**Low**: Not detected during current survey. Five old records of species occurrence found within 5km of the site. No habitat associations present on site.
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3		Distribution & Ecology: from southern Victoria through south- and central-eastern New South Wales. In spring and summer, they are generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands,particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. Foraging: mainly on seeds of native and introduced trees and shrubs, with a preference for eucalypts,	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				wattles and introduced hawthorns. They will also eat berries, fruits, nuts and insects and their larvae. Breeding: Favours old growth forest and woodland attributes for nesting and roosting. Roosting: Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts. Relevant threats: Aggressive exclusion from forest and woodland habitat by over abundant Noisy Miners. Susceptible to Psittacine cirovirus disease spread through contaminated nesting hollows.	
Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2		Distribution & Habitat: Uncommon, although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Foraging: Black Sheoak (Allocasuarina littoralis) and Forest Sheoak (A. torulosa) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, Allocasuaraina diminuta, and A. gymnathera. Belah (Casuarina cristata) is also utilised and may be a critical food source for some populations. Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill. Orts discarded at base of tree can be an indicator of local populations, with fresh orts a light tan/pale brown and older orts grey. Breeding: A single egg is laid between March and May. Roosting: Dependent on large hollow-bearing eucalypts for nest sites.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2		Distribution & Habitat: Uncommon, although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. Inhabits open forest and woodlands of the coast and the Great Dividing	**Low:** Not detected during current survey. There are eight recorded occurrences within 5km of the site with four of these being recent records (within the last 10years).

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				Range where stands of sheoak occur. Foraging: Black Sheoak (Allocasuarina littoralis) and Forest Sheoak (A. torulosa) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, Allocasuaraina diminuta, and A. gymnathera. Belah (Casuarina cristata) is also utilised and may be a critical food source for some populations. Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill. Orts discarded at base of tree can be an indicator of local populations, with fresh orts a light tan/pale brown and older orts grey. Breeding: A single egg is laid between March and May. Roosting: Dependent on large hollow-bearing eucalypts for nest sites.	No habitat associations present on site.
Caretta caretta	Loggerhead Turtle	E1,P	E	Loggerhead Turtles are found in tropical and temperate waters off the Australian coast. In NSW they are seen as far south as Jervis Bay and have been recorded nesting on the NSW north coast and feeding around Sydney. Loggerhead Turtles are ocean-dwellers, foraging in deeper water for fish, jellyfish and bottom-dwelling animals. The female comes ashore to lay her eggs in a hole dug on the beach in tropical regions during the warmer months.	**Low:** Not detected during current survey. Three new records of species occurrence found within 5km of the site. No habitat associations present on site.
Cercartetus nanus	Eastern Pygmy-possum	V,P		Distribution & Ecology: south-eastern Australia, from southern Queensland to eastern South Australia and in Tasmania. In NSW it extents from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Foraging: Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable. Also feeds on insects throughout the year; this feed source may be more important in habitats where flowers are less abundant such as wet forests. Nesting: Shelters in tree hollows, rotten stumps,	**High**: Not detected during current survey. There are 419 recently recorded occurrences within 5km of the site with the last record being from 2021. Habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				holes in the ground, abandoned bird-nests, Ringtail Possum (Pseudocheirus peregrinus) dreys or thickets of vegetation, (e.g. grass-tree skirts); nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks. Breeding: Young can be born whenever food sources are available, however most births occur between late spring and early autumn. Behaviour: Agile climbers, but can be caught on the ground in traps, pitfalls or postholes; generally nocturnal. Frequently spends time in torpor especially in winter, with body curled, ears folded and internal temperature close to the surroundings.	
Chalinolobus dwyeri	Large-eared Pied Bat	V,P	V	Distribution & Ecology: generally rare with a very patchy distribution in NSW. Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands, and in Found in well-timbered areas containing gullies. Roosting: Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open forest and woodland close to these features. Likely to hibernate through the coolest months. Breeding: It is uncertain whether mating occurs early in winter or in spring. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Foraging: probably for small, flying insects below the forest canopy. Notable Threats: goats, pesticides, land clearing.	**High:** Not detected during current survey. There are 328 recent records (within 10 years) within 5km of the site. Habitat associations present on site.
Charadrius leschenaultii	Greater Sand-plover	V,P	V,C,J,K	The Greater Sand-plover breeds in central Asia from Armenia to Mongolia, moving further south for winter. In Australia the species is commonly recorded in parties of 10-20 on the west coast, with the far northwest being the stronghold of the population. The species is apparently rare on the east coast, usually found singly. In NSW, the species has been recorded between the northern rivers and the Illawarra, with most records coming	**Extremely Low:** Not detected during current survey. Three old records of species occurrence found within 5km of the site. No habitat

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				from the Clarence and Richmond estuaries. Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders. Diet includes insects, crustaceans, polychaete worms and molluscs. Prey is detected visually by running a short distance, stopping to look, then running to collect the prey.	associations present on site
Charadrius mongolus	Lesser Sand-plover	V,P	E,C,J,K	The Lesser Sand-plover breeds in central and north eastern Asia, migrating further south for winter. In Australia the species is found around the entire coast but is most common in the Gulf of Carpentaria, and along the east coast of Queensland and northern NSW. Individuals are rarely recorded south of the Shoalhaven estuary, and there are few inland records. Almost entirely coastal in NSW, favouring the beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats; occasionally occurs on sandy beaches, coral reefs and rock platforms. Highly gregarious, frequently seen in flocks exceeding 100 individuals; also often seen foraging and roosting with other wader species. Roosts during high tide on sandy beaches, spits and rocky shores; forage individually or in scattered flocks on wet ground at low tide, usually away from the water's edge. Diet includes insects, crustaceans, molluscs and marine worms. Prey is usually detected visually with the birds making short, quick runs, with abrupt stops to lunge at the ground or look for prey	**Extremely Low:** Not detected during current survey. Three old records of species occurrence found within 5km of the site. No habitat associations present on the subject site.
Chelonia mydas	Green Turtle	V,P	V	Distribution & Ecology: Widely distributed in tropical and sub-tropical seas. Usually found in tropical waters around Australia but also occurs in coastal waters of NSW, where it is generally seen on the north or central coast, with occasional records from the south coast. Behaviour: Ocean-dwelling species spending most of its life at sea. Diet: Carnivorous when young but as adults they feed only on marine plant material.	**Extremely Low:** Not detected during current survey. Eight old records of species occurrence found within 5km of the site. No habitat associations present on site

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				Breeding: Eggs laid in holes dug in beaches throughout their range, with scattered nesting records along the NSW coast.	
Chlidonias leucopterus	White-winged Black Tern	P	C,J,K	The White-winged Black Tern is a migratory species which visits Australia but does not breed here. The species usually nests in northern Europe and Asia, with the Asian birds more likely to visit our shores. When in Australia, the species usually inhabits coastal or sub coastal wetlands, where it catches insects on the wing, flying back and forth over the water or wetland vegetation, snatching the insects in their bills, or dipping or diving into the water to catch fish, frogs and tadpoles.	**Extremely Low**: Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on the subject site.
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P		Distribution & Ecology: endemic to eastern Australia, occuring in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. Less commonly found on coastal plains and ranges. Sedentary, considered to be resident in many locations throughout its range; present in all seasons or year-round at many sites; territorial year-round, though some birds may disperse locally after breeding. Gregarious and usually observed in pairs or small groups of 8 to 12 birds; terrestrial and arboreal in about equal proportions; active, noisy and conspicuous while foraging on trunks and branches of trees and amongst fallen timber; spend much more time foraging on the ground and fallen logs than other treecreepers. Foraging: When foraging in trees and on the ground, they peck and probe for insects, mostly ants, amongst the litter, tussocks and fallen timber, and along trunks and lateral branches; up to 80% of the diet is comprised of ants; other invertebrates (including spiders, insects larvae, moths, beetles, flies, hemipteran bugs, cockroaches, termites and lacewings) make up the remaining percentage; nectar from Mugga Ironbark (Eucalyptus sideroxylon) and paperbarks, and sap from an unidentified eucalypt are also eaten, along with lizards and food scraps; young birds are fed ants, insect larvae, moths, craneflies, spiders and butterfly and moth larvae. Roosting: Hollows in standing dead or live trees and tree stumps. Breeding: In pairs or cooperatively breeding groups of two to five birds.	**Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. Some habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Cuculus optatus	Oriental Cuckoo	P	C,J,K	It has a large breeding range in northern Eurasia. It breeds across much of Russia west to the Komi Republic with occasional records as far west as Saint Petersburg. It also breeds in northern Kazakhstan, Mongolia, northern China, Korea and Japan. The exact extent of its wintering range is uncertain due to its secretive habits and the difficulty of separating it from the Himalayan cuckoo and other similar species. It is believed to include the Malay Peninsula, Indonesia, the Philippines, New Guinea, western Micronesia, the Solomon Islands and northern and eastern Australia with occasional birds reaching New Zealand. It mainly inhabits forests, occurring in coniferous, deciduous and mixed forest. It feeds mainly on insects and their larvae, foraging for them in trees and bushes as well as on the ground. It is usually secretive and hard to see. It is a brood parasite, laying its eggs in the nests of other birds. The nests of Phylloscopus warblers such as the Arctic warbler, eastern crowned warbler, willow warbler and chiffchaff are commonly used. Other hosts include the olive-backed pipit and Asian stubtail. The eggs are smooth, slightly glossy and vary in colour, sometimes mimicking those of the host species. They are incubated for about 12 days. The young birds fledge after around 17–19 days.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Daphoenositta chrysoptera	Varied Sittella	V,P		Distribution & Ecology: Sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Foraging: Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. Breeding: July – December. Nesting: Cup-shaped nest in a tree fork, often use the same fork or tree for successive years. Relevant threats: adversely affected by the dominance of Noisy Miners in woodland patches.	**Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. Some habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Dasyornis brachypterus	Eastern Bristlebird	E1,P,2	E	Ecology & Distribution: Occurs in a varity of habitat, however it is relatively rare and occurs in three disjunct, localised coastal populations: one in the QLD/NSW border area, One in the Illawara/Jervis Bay, and one in the NSW/VIC border area. Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. In northern NSW the habitat occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone; all of these vegetation types are fire prone. Behaviour: Shy and cryptic and rarely flies, although can be seen scampering over the ground; when approached, may move to a lookout perch 1 m or more above the ground, then retreat into dense vegetation. Foraging: Feeds on a variety of insects, particularly ants. Nesting: elliptical domes constructed on or near the ground amongst dense vegetation. Breeding: August to February; producing more than one clutch a year is rare. Notable threats: bitou bush and other weed infestations, inappropriate fire regimes and vehicular slaughter.	**Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. Some associations present on site.
Diomedea antipodensis	Antipodean Albatross	V,P	V	The species ranges across the southern Pacific Ocean, east to the coast of Chile and west to eastern Australia. Habitat and ecology: The majority of birds breed on Antipodes Island, with a small number of pairs breeding on Campbell Island. The Antipodean Albatross breeds biennially in colonies on ridges, slopes and plateaus of isolated subantarctic islands, usually in vegetation such as grass tussocks. Egg laying begins in January (Antipodes Island) and February (Campbell Island), and chicks usually fledge the following year in January and March. The annual breeding population is relatively small and has been estimated at 5,154 pairs. This species regularly occurs in small numbers off the NSW south coast from Green Cape to Newcastle during winter where they feed on cuttlefish. Although representing a small proportion on its total foraging area, potential forage in NSW waters is	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				nonetheless considered significant for the species. Forage for the Antipodean Albatross is extremely patchy, both spatially and temporally, and individuals traverse great distances in search of food. This species feeds pelagically on squid, fish and crustaceans.	
Diomedea epomophora	Southern Royal Albatross	P	V	Most of the royal albatross population is found between 30° S and 45° S. The majority of the world's population of southern royal albatrosses nest on the rat free Subantarctic Campbell Island, around 8,200 to 8,600 pairs. There are smaller colonies on Adams Island and Auckland Island in the Auckland Islands, 20 pairs combined, and 69 pairs on Enderby Island and some sanfordi × epomophora hybrids at the northern royal albatross colony on the Otago Peninsula in New Zealand. They range along the southern oceans concentrating on the west and east coast of southern South America, and also in the waters surrounding New Zealand.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Diomedea exulans	Wandering Albatross	E1,P	E	Distribution & Ecology: visits Australian waters extending from Fremantle, Western Australia, across the southern water to the Whitsunday Islands in Queensland between June and Spetember. It has been recorded along the length of the NSW coast. At other times birds roam the southern oceans and commonly follow fishing vessels for several days. They spend the majority of their time in flight, soaring over the southern oceans. Foraging: They feed in pelagic, offshore and inshore waters, often at night, taking fish and cephalopods such as squid, crustaceans and carrion, and will often follow ships feeding on the refuse they trail. Breeding: on a number of islands just north of the Antarctic Circle, including the Australian owned Macquarie Island. Breeding takes place on exposed ridges and hillocks, amongst open and patchy vegetation. Roosting: bienially in small, loose colonies among grass tussocks, using a large mud nest.	**Extremely Low:** Not detected during current survey. Seven old records of species occurrence found within 5km of the site. No habitat associations present on site
Diomedea sanfordi	Northern Royal Albatross		E	The Northern Royal Albatross breeds in New Zealand waters. The main population (estimated at 6,500 to 7,000 pairs) nests on islands off the Chatham Islands, and up to 50 pairs nest at Taiaroa	**Extremely Low**: Not detected during current

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				Head on the South Island. Away from its nesting sites this Albatross is circumpolar between 30 and 45 degrees south. Most the population spends the non-breeding period off both coasts of southern South America, especially off Chile and Argentina. It is a rare visitor to NSW waters, predominantly visiting southern waters in the winter and early spring period. The Northern Royal Albatross primarily forages in inshore and offshore waters over the continental shelf to the shelf edge. It feeds mainly on cephalopods and fish, but also salps, crustacea and carrion.	survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Erythrotriorchis radiatus	Red Goshawk	E4A,P,2	V	This unique Australian endemic raptor is distributed sparsely through northern and eastern Australia, from the western Kimberley Division of northern Western Australia to north-eastern Queensland and south to far north-eastern NSW, and with scattered records in central Australia. The species is very rare in NSW, extending south to about 30°S, with most records north of this, in the Clarence River Catchment, and a few around the lower Richmond and Tweed Rivers. Formerly, it was at least occasionally reported as far south as Port Stephens. Red Goshawks inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers. Adults appear to occupy territories throughout the year and breeding territories are traditionally used from year to year. Adults have large home-ranges, estimated in the Northern Territory to be as great as about 120 km2 for females and 200 km2 for males. Red Goshawks mainly eat medium to large birds, including species as large as Australian Brush-turkeys, Kookaburras, Tawny Frogmouths, Sulphur-crested Cockatoos and Rainbow Lorikeets, but they also take mammals, reptiles and insects. Red Goshawks usually hunt from concealed or, less often, exposed perches, but also fly close above or through forest or woodland searching for prey. They often hunt from perches early in the morning and	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				late in the day and tend to hunt more on the wing at other times of the day. The breeding behaviour of Red Goshawks is not well known. Breeding is likely to be in spring and summer in southern Queensland and NSW. The birds lay clutches of 1-2 eggs between July and September, in a stick nest in a tall tree (>20 m tall) within 1 km of a watercourse or wetland. Young fledge around November and December. In winter in eastern Australia, the birds appear to move from nesting sites in the ranges to coastal plains, where they are associated with permanent wetlands. The age at which Red Goshawks first breed is not known, nor is the life expectancy. Young remain with their parents for at least 70-80 days after they leave the nest and may remain with their parents for 4-5 months.	
Esacus magnirostris	Beach Stone-curlew	E4A,P		Beach Stone-curlews are found exclusively along the coast, on a wide range of beaches, islands, reefs and in estuaries, and may often be seen at the edges of or near mangroves. They forage in the intertidal zone of beaches and estuaries, on islands, flats, banks and spits of sand, mud, gravel or rock, and among mangroves. Beach Stone-curlews breed above the littoral zone, at the backs of beaches, or on sandbanks and islands, among low vegetation of grass, scattered shrubs or low trees; also among open mangroves. Beach Stone-curlews are usually seen alone or in pairs, but sometimes occur in small groups. Birds forage by stalking slowly like a heron or with quicker dashes after prey. The diet consists of crabs and other marine invertebrates. They are mainly active at dawn, dusk and at night. In NSW, clutches have been recorded from early October to late March, but elsewhere in temperate Australia, breeding has been recorded from September. Their nests are just a shallow scrape in sand or gravel, above the tidal zone at the backs of beaches, or on sandbanks and islands or among open mangroves. Only one egg is laid, but birds will re-lay after the failure of a breeding attempt. Both parents defend the nest and care for the young.	**Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Eudyptula minor	Little Penguin in the Manly Point Area (being the area on and near the shoreline from Cannae Point generally northward to the point near the intersection of Stuart Street and Oyama Cove Avenue, and extending 100 metres offshore from that shoreline)	E2,P		Little Penguins occur in temperate seas with water temperatures between 13 degrees C and 20 degrees C. Within this region, the Little Penguin feeds mainly in inshore waters around the coast and breeding islands, and out to the continental shelf. Most breeding pairs live in colonies, although some nest on their own. Colonies are usually found on islands, with only scattered locations known on the mainland.	**Low:** Not detected during current survey. There are 33 recorded occurrences within 5km of the site with 29 of these being recent records (within the last 10years). No habitat associations present on site.
Falco hypoleucos	Grey Falcon	E1,P,2		The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. The breeding range has contracted since the 1950s with most breeding now confined to arid parts of the range. There are possibly less than 5000 individuals left. Population trends are unclear, though it is believed to be extinct in areas with more than 500mm rainfall in NSW. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Fregata ariel	Lesser Frigatebird	P	C,J,K	The Lesser frigatebird is a marine, pelagic species found throughout tropical waters of Indian, western and central Pacific Oceans, with an isolated population in the west Atlantic Ocean. They often recorded crossing wide expanses of open ocean and are less frequently seen close to coastlines, in inshore waters and over land. They breed on isolated, sparsely vegetated, oceanic islands, cays and atolls.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Fregata minor	Great Frigatebird	P	C,J	The great frigatebird (Fregata minor) is a large seabird with major nesting populations in the tropical Pacific (including the Galapagos Islands) and Indian Oceans, as well as a tiny population in the South Atlantic. The great frigatebird has a wide	**Extremely Low**: Not detected during current survey. No records of

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				distribution throughout the world's tropical seas including the Pacific Ocean, Coral Sea, numerous Indian Ocean islands including Aldabra, Christmas Island, the Maldives and Mauritius. The Atlantic population, restricted to Trindade and Martin Vaz, is very small. Great frigatebirds undertake regular migrations across their range, both regular trips and more infrequent widespread dispersals. Despite their extended range, birds also exhibit philopatry, breeding in their natal colony even if they travel to other colonies The species feeds on fish taken in flight from the ocean's surface (mostly flying fish), and indulges in kleptoparasitism less frequently than other frigatebirds. They feed in pelagic waters within 80 km (50 mi) of their breeding colony or roosting areas.	species occurrence found within 5km of the site. No habitat associations present on site.
Fregetta grallaria	White-bellied Storm-Petrel	V,P	V	A wide oceanic distribution in the south Pacific and Atlantic Oceans, ranging into tropical waters from various breeding grounds. Known to breed at various island groups including Lord Howe Island. Marine. In Australia breeds only on offshore islands in the Lord Howe Island group. Nest consists of a chamber usually located amongst large rocks. Vagrant birds occur in coastal NSW waters, particularly after storm events.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Gallinago hardwickii	Latham's Snipe	P	J,K	Distribution & Ecology: non- breeding visitor to south eastern Australia and is a passage migrant through northern Australia. They occur in a wide variety of permanent and ephemeral wetlands up to 2000 m above sea-level. Foraging: characterised by areas of mud and some form of cover. Omnivorous species that feeds on seeds and other plant material, and on invertebrates including insects (mainly flies and beetles), earthworms and spiders and occasionally molluscs, isopods and centipedes. Breeding: in Japan and far eastern Russia, in the northen hempisphere summer, and arriving in Australia from July. Nesting: on dry ground such as grassy hillsides and forest clearings. The nest is a shallow depression lined with grasses and leaves.	Extremely Low: Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on site
Glossopsitta pusilla	Little Lorikeet	V,P		Distribution & Habitat: Widely distributed across the coastal and Great Divide regions of eastern Australia. Nomadic movements are common, influenced by season and food availability.	**Moderate:** Not detected during current survey.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				Foraging: primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophoras, Melaleucas and other tree species. Roosts: in treetops, often distant from feeding areas Breeding: May – September. Most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m).	There are 22 recorded occurrences within 5km of the site with two of these being recent records (within the last 10years). Some habitat associations present on site.
Grantiella picta	Painted Honeyeater	V,P	V	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Gygis alba	White Tern	V,P		Occurs widely in tropical and subtropical seas and islands. The subspecies on Lord Howe Island is rarely seen on the mainland but occurs on Norfolk and Kermadec Islands. Most breeding sites on Lord Howe Island are close to the lagoon in the settlement area. Marine A recent arrival to Lord Howe Island, only breeding there since the 1960s. This species nests in the high branches of trees. On Lord Howe Island it nests in the introduced Norfolk Island Pine as well as native Sallywood, Blackbutt, Greybark, Banyan and Pandanus. White Terns do not build a nest but select a depression or damaged area on the branch of a tree on which to balance their egg. Breeding and non-breeding birds roost in the trees during the night. Vagrant birds occur in coastal NSW waters, particularly after storm events.	**Extremely Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on the subject site.
Haematopus fuliginosus	Sooty Oystercatcher	V,P		Distribution & Ecology: found around the entire Australian coast, including offshore islands, being most common in Bass Strait. Small numbers of the species are evenly distributed along the NSW	**Moderate:** Not detected during current survey.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				coast. The species favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. Foraging: It forages on exposed rock or coral at low tide for foods such as limpets and mussels. Breeding: in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. Nesting: a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks.	There are 38 recorded occurrences within 5km of the site with five of these being recent records (within the last 10years). Some habitat associations present on site.
Haematopus longirostris	Pied Oystercatcher	E1,P		Distribution & Ecology: around the entire Australian coastline, although most common in coastal Tasmania and parts of Victoria, such as Corner Inlet. In NSW they are is thinly scattered along the entire coast, with fewer than 200 breeding pairs estimated to occur in the state. They favour intertidal flats of inlets and bays, open beaches and sandbanks. Foraging: They forage on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish. Breeding: August - January. The female is the primary incubator and the young leave the nest within several days. Roosting: They nest mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas.	**Low:** Not detected during current survey. There are 12 recorded occurrences within 5km of the site with six of these being recent records (within the last 10years). No habitat associations present on site.
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P		Distribution & Ecology: along the coastline (including offshore islands) of mainland Australia and Tasmania, occasionally extending inland along some of the larger waterways. Found in coastal habitats and around terrestrial wetlands. Habitats occupied are characterised by the presence of large areas of open water. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas. Foraging: generally forages over large expanses of open water; also forage over open terrestrial habitats Behaviour: generally seen singly or in pairs. Hunts its prey from a perch or whilst in flight. Breeding: June to September. Breeds in solitary and monogamous pairs that mate for life. Roosting: The nest is a large structure made of sticks and lined with leaves, grass or seaweed. They may be built in a variety of sites including tall	**High:** Not detected during current survey. There are 13 recorded occurrences within 5km of the site with eight of these being recent records (within the last 10years). Due the the large range of habitats that this species inhabits for both foraging and nesting this species cannot be ruled out.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				trees, bushes, mangroves, cliffs, rocky outcrops, crevices, on the ground or even on artificial structures. Relevant threats: Increased mortality or reduced breeding success due to non-target poisoning during vertebrate pest control, exposure to industrial chemicals and pesticides.	
Heleioporus australiacus	Giant Burrowing Frog	V,P	V	The Giant Burrowing Frog is distributed in south eastern NSW and Victoria, and appears to exist as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites. Whilst in non-breeding habitat it burrows below the soil surface or in the leaf litter. Individual frogs occupy a series of burrow sites, some of which are used repeatedly. The home ranges of both sexes appear to be non-overlapping suggesting exclusivity of non-breeding habitat. Home ranges are approximately 0.04 ha in size. Individuals move into the breeding site either immediately before or following heavy rain and occupy these sites for up to 10 days. Most individuals will not attempt to breed every year. The Giant Burrowing Frog has a generalist diet and studies to date indicate that they eat mainly invertebrates including ants, beetles, cockroaches, spiders, centipedes and scorpions. When breeding, frogs will call from open spaces, under vegetation or rocks or from within burrows in the creek bank. Males show strong territoriality at breeding sites. This species breeds mainly in autumn, but has been recorded calling throughout the year. Egg masses are foamy with an average of approximately 500-800 eggs and are laid in burrows or under vegetation in small pools. After rains, tadpoles are washed into larger pools where they complete their development in ponds or ponded areas of the creekline. Tadpole development ranges from around 12 weeks duration to up to 12 months with late developing tadpoles overwintering	**Low:** Not detected during current survey. Two old records of species occurrence found within 5km of the site. Habitat associations present on site

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				and completing development when warmer temperatures return. Breeding habitat of this species is generally soaks or pools within first or second order streams. They are also commonly recorded from 'hanging swamp' seepage lines and where small pools form from the collected water. This frog is a slow growing and long-lived species, living up to 10 years of age, possibly longer.	
Hieraaetus morphnoides	Little Eagle	V,P		Distribution & Ecology: found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escaprment. Occurs as a single population throughout NSW through open eucalypt forest, woodland or open woodland. Also uses She-oak or acacia woodlands and riparian woodlands of interior NSW. Foraging: Generalist predator, preying on birds, reptiles, and mammals; occasionally large insects and carrion. Breeding: in spring, with young fledging in early summer. Nesting: Pairs build a large stick nest in winter in tall living trees within a remnant patch of vegetation. Relevant threats: Secondary poisoning from rabbit baiting.	**Low:** Not detected during current survey. Three old records of species occurrence found within 5km of the site. No habitat associations present on site.
	White-throated Needletail	P	V,C,J,K	Distribution & Ecology: Widespread in eastern and south-eastern Australia. Almost exclusively aerial. Occuring over most types of habitat, they are probably recorded most often above wooded areas, including open forest, heathlands and rainforest but less often over treeless areas, such as grassland or swamps. Foraging: aerially, often in areas of updraughts. They eat a wide variety of insects, including beetles, cicadas, flying ants, bees, wasps, flies, termites, moths, locusts and grasshoppers. Roosting: in trees in forests and woodlands, both among dense foliage in the canopy or in hollows. It has been suggested that they also sometimes roost aerially. Breeding: eastern Siberia, north-eastern China and Japan, leaving the breeding grounds from August. They begin appearing in Australia from September for the non-breeding season.	**Low:** Not detected during current survey. Three old records of species occurrence found within 5km of the site. Habitat associations present on site

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Hoplocephalus bungaroides	Broad-headed Snake	E1,P,2	V	Distribution & Ecology: largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. Found in rocky outcrops and adjacent sclerophyll forest and woodland. Most suitable sites occur in sandstone ridgetops. They prefer sites with a W to NW aspect, sheltering under thin (<20 cm) rocks on exposed sites, which fit closely with a rocky substrate. Occupied crevices have a sunny aspect and rocks used are those that receive the most warmth from the sun. In woodland, they shelter in hollows in a variety of tree species. Behaviour: Nocturnal. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in crevices or hollows in large trees within 500m of escarpments in summer. Diet: Feeds mostly on geckos and small skinks; will also eat frogs and small mammals occasionally. Breeding: Females produce 4-12 live young from January to March.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Hydroprogne caspia	Caspian Tern	P	J	Distribution & Ecology: Within Australia it has a widespread occurrence and can be found in both coastal and inland habitat. They are mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. Foraging: usually in open wetlands, including lakes and rivers. They often prefer sheltered shallow water near the margins, but can also be found in open coastal waters. Their diet consists predominantly of fish, as well as the eggs and young of other birds, carrion, aquatic invertebrates, flying insects and earthworms. Breeding: main breeding period of September–December in the southern Hemisphere, though timing varies in different areas. In southern Australia, breeding has been recorded during July to late February in various years. In northern Australia, there is no apparent fixed breeding season, with eggs recorded in March and May to November on variable types of sites including low islands, cays, spits, banks, ridges, beaches of sand or shell, terrestrial wetlands and stony or rocky	**Low:** Not detected during current survey. There are 15 recorded occurrences within 5km of the site with two of these being recent records (within the last 10years). No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				islets or banks. Nesting: a deep scrape on the ground, usually unlined, but occasionally sparsely ringed with debris or scraps of local vegetation. Nests may be in the open, or among low or sparse vegetation, including herbfield, tussocks, samphire or other prostrate sand-binding plants.	
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E1,P	E	The Southern Brown Bandicoot has a patchy distribution. It is found in south-eastern NSW, east of the Great Dividing Range south from the Hawkesbury River, southern coastal Victoria and the Grampian Ranges, south-eastern South Australia, south-west Western Australia and the northern tip of Queensland. Southern Brown Bandicoots are largely crepuscular (active mainly after dusk and/or before dawn). They are generally only found in heath or open forest with a heathy understorey on sandy or friable soils. They feed on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruiting) fungi. Their searches for food often create distinctive conical holes in the soil. Males have a home range of approximately 5-20 hectares whilst females forage over smaller areas of about 2-3 hectares. Nest during the day in a shallow depression in the ground covered by leaf litter, grass or other plant material. Nests may be located under Grass trees Xanthorrhoea spp., blackberry bushes and other shrubs, or in rabbit burrows. The upper surface of the nest may be mixed with earth to waterproof the inside of the nest. Mating occurs any time of the year, usually following heavy rain. Two or three litters of 2-4 young may be produced annually. The gestation period of 11-12 days is the shortest known of any marsupial while young remarkably become independent around 60 days after being born.	**Moderate:** Not detected during current survey. One new record of species occurrence found within 5km of the site. Habitat associations present on site.
Ixobrychus flavicollis	Black Bittern	V,P		Distribution & Ecology: from southern NSW north to Cape York and along the north coast to the Kimberley region. Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Foraging: feeds on insects and aquatic/semi-aquatic vertebrate species, at dusk and night. Roosts: by day in trees or amongst dense reeds. Behaviour: generally solitary.	**Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				Breeding: December to March. Nests, built in spring are located on a branch overhanging water and consist of a bed of sticks and reeds on a base of larger sticks.	
Lathamus discolor	Swift Parrot	E1,P,3	CE	Distribution & Ecology: occurs in woodlands and forests of NSW from May to August. Migrates from Tasmania to southeast Australia between March – October. Preferred non-breeding habitat is woodlands and riparian vegetation where there are winter flowering eucalypts such as the Swamp Mahogany, Eucalyptus robusta in coastal areas. Foraging: in eucalpyt dominated forests, where eucalypts are flowering profusely or where there are abundant lerp infestations. They return to some foraging sites on a cyclic basis depending on food availability. Diet includes eucalypt nectar, pollen and associated insects. Breeding: September to January in Tasmania. Nesting: in old trees with hollows. Relevant threats: Aggressive exclusion from forest and woodland habitat by over abundant Noisy Miners	**Low:** Not detected during current survey. Two new records of species occurrence found within 5km of the site. No habitat associations present on site.
Limosa lapponica	Bar-tailed Godwit	P	C,J,K	Distribution & Ecology: recorded in coastal areas of all Australian States. Found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. Breeding: late May through June, in Scandinavia, Russia, and north-west Alaska. Nest is a shallow cup in moss sometimes lined with vegetation. Foraging: usually near the edge of water or in shallow water, mainly in tidal estuaries and harbours. They appear not to forage at high tide and prefer exposed sandy substrates on intertidal flats, banks and beaches. Occasionally they have been known to forage among mangroves, or on coral reefs or rock platforms among rubble, crevices and holes. Roosting: The Bar-tailed Godwit usually roosts on sandy beaches, sandbars, spits and also in near-coastal saltmarsh.	**Moderate:** Not detected during current survey. Three new records of species occurrence found within 5km of the site. Some habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Limosa lapponica baueri	Bar-tailed Godwit (baueri)	P	V	The Bar-tailed Godwit is a migratory wader which undertakes the largest non-stop flight of any bird. The trans-Pacific route from its breeding grounds in the Arctic to its non-breeding grounds in the southern hemisphere covers over 11,000 km. Birds arrive in New South Wales between August and October and then leave between February and April, with a small number of individuals overwintering. The subspecies is most frequently recorded along major coastal river estuaries and sheltered embayments, particularly the Tweed, Richmond, Clarence, Macleay, Hastings, Hunter and Shoalhaven river estuaries, Port Stephens and Botany Bay. It is a rare visitor to wetlands away from the coast with scattered records as far west as along the Darling River and the Riverina. Habitat and ecology: found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Less frequently it occurs in salt lakes and brackish wetlands, sandy ocean beaches and rock platforms.It often occurs around beds of seagrass, and sometimes in nearby saltmarsh or the outer margins of mangrove areas. It forages at low to mid tide in shallow water or along the water's edge on sandy substrates on intertidal flats, banks and beaches or on soft mud substrates. Its diet consists of worms, molluscs, crustaceans, insects and some plant material. In NSW its high tide roost areas on sandy beaches, sandbars, spits and near-coastal saltmarsh are frequently shared with other shorebirds.It is rarely found on inland wetlands or in areas of short grass such as farmland, paddocks and airstrips. In large part, the observed decline in Bar-tailed Godwit (Western Alaskan) numbers across Australia stems from ongoing loss of intertidal mudflat habitat at key migration staging sites in the Yellow Sea.	**Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. Some habitat associations present on site.
Litoria aurea	Green and Golden Bell Frog	E1,P	V	Distribution & Habitat: Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (Typha spp.) or spike rushes (Eleocharis spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (Gambusia holbrooki), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region	**Extremely Low:** Not detected during current survey. Two old records of species occurrence found within 5km of the site. No habitat

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				occur in highly disturbed areas. Behaviour: active by day Breeding: in summer when conditions are warm and wet Relevant threats: predation by feral animals such as foxes.	associations present on site
Lophoictinia isura	Square-tailed Kite	V,P,3		Distribution & Ecology: Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Foraging: a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy. Appears to occupy large hunting ranges of more than 100km2 Breeding: July to February. Nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.	**Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. No habitat associations present on site.
Macronectes giganteus	Southern Giant Petrel	E1,P	E	Southern Giant-Petrels breed on six subantarctic and Antarctic islands in Australian territory; Macquarie Island, Heard Island and McDonald Island in the Southern Ocean, and Giganteus Island, Hawker Island, and Frazier Island in the Australian Antarctic Territories. Southern Giant-Petrele are marine bird that occur in Antarctic to subtropical waters. In summer, they mainly occur over Antarctic waters, and it is widespread south as far as the pack-ice and onto the Antarctic continent. At sea, Southern Giant-Petrels feed mainly on the surface, but might occasionally dive to shallow depths. On the pack-ice, it will roost on icebergs and snow slopes at the sea edge.	**Extremely Low:** Not detected during current survey. Two old records of species occurrence found within 5km of the site. No habitat associations present on site
Macronectes halli	Northern Giant-Petrel	V,P	V	The Northern Giant-Petrel has a circumpolar pelagic distribution, usually between 40-64ºS in open oceans. Their range extends into subtropical waters (to 28ºS) in winter and early spring, and they are a common visitor in NSW waters, predominantly along the south-east coast during winter and autumn. Habitat and ecology: Breeding in Australian territory is limited to Macquarie Island and occurs during spring and summer. Adults usually remain near the breeding colonies throughout the year (though some do travel widely) while immature birds make long and poorly known circumpolar and trans-oceanic movements. Hence most birds recorded in NSW coastal waters are	**Extremely Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on site

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				immature birds. Northern Giant-Petrels seldom breed in colonies but rather as dispersed pairs, often amidst tussocks in dense vegetation and areas of broken terrain. A single chick is raised and although breeding occurs annually, approximately 30% of the potential breeding population do not nest. There are marked differences in diet between the sexes. Females obtain most of their prey live from the sea, while males also scavenge from the carcases of penguins and seals on land. At sea, both sexes are aggressive opportunists, feeding on fish, cephalopods, birds and crustaceans, including euphausiids or krill, and regularly scavenge on fishing vessels. During the vulnerable early chick phase adult birds utilise land-based carrion resources (e.g. seals) extensively.	
Meridolum maryae	Maroubra Woodland Snail	E1		The species is found in the leaf litter of coastal vegetation communities, most commonly in heathland on foredunes also from areas of podsolised dunes/sand plains that support taller heath communities including Eastern Suburbs Banksia Scrub Can dig several centimetres into soil during dry conditions The species is typically active at night but can also move about on overcast or rainy days The ability for individuals to disperse is expected to be similar to closely related camaenids which can move around 3.5 m in a day and 350 m in a lifetime	**Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. Some habitat associations present on site.
Miniopterus australis	Little Bent-winged Bat	V,P		Distribution & Ecology: East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. Prefers moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Roosting: by day in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings. Foraging: at night, for small insects beneath the canopy of densely vegetated habitats. Breeding: Maternity colonies form in spring and birthing occurs in early summer. Males and juveniles disperse in summer. Only five nursery sites/maternity colonies are known in Australia.	**High:** Not detected during current survey. There are 159 recorded occurrences within 5km of the site with 158 of these being recent records (within the last 10years). Habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				Often shares roosting sites with other Miniopterus species.	
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P		Distribution & Ecology: Occurs along the east and north-west coasts of Australia. Roosts: Caves are the primary roosting habitat but also use man-made structures. Breeding: Spring and Summer. Form discrete populations centered on large maternity caves. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Foraging: in forested areas, catching flying insects above the canopy. Behaviour: Cold caves are used for hibernation in southern Australia.	**High:** Not detected during current survey. There are 1491 recorded occurrences within 5km of the site with 1478 of these being recent records (within the last 10years). Habitat associations present on site.
Mixophyes balbus	Stuttering Frog	E1,P,2	V	Distribution & Ecology: occurs along the east coast of Australia, from Southern Queensland to north-eastern Victoria. Inhabits rainforest, Antarctic beech and wet sclerophyll forests but also found in moist gullies within areas of dry forest, sometimes utilising very small trickles of water which hardly flow. Depends on freshwater streams and riparian vegetation for breeding and habitation. Shelter: Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Foraging: insects and smaller frogs. Breeding: streams during summer after heavy rain. Eggs are laid on rock shelves or shallow riffles in small, flowing streams. Notable Threats: chytrid fungus, reduced water quality, predation of eggs and tadpoles by introduced species (i.e. Gambusia)	**Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. Some habitat associations present on site.
Motacilla flava	Yellow Wagtail	P	C,J,K	This species breeds in much of temperate Europe and Asia. It is resident in the milder parts of its range, such as western Europe, but northern and eastern populations migrate to Africa and south Asia. This insectivorous bird inhabits open country near water, such as wet meadows. It nests in tussocks, laying 4–8 speckled eggs. Does not breed in Australia.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Myotis macropus	Southern Myotis	V,P		Distribution & Habitat: found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Foraging: over streams and pools catching insects	**Moderate:** Not detected during current survey. There are 14 recorded

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				and small fish by raking their feet across the water surface. Roosts: in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Breeding: In NSW, one young per year usually in November or December.	occurrences within 5km of the site with 14 of these being recent records (within the last 10years). Some habitat associations present on site.
Neophema chrysogaster	Orange-bellied Parrot	E4A,P,3	CE	On the mainland, the Orange-bellied Parrot spends winter mostly within 3 km of the coast in sheltered coastal habitats including bays, lagoons, estuaries, coastal dunes and saltmarshes. The species also inhabits small islands and peninsulas and occasionally saltworks and golf courses. Birds forage in low samphire herbland or taller coastal shrubland. Diet mainly comprises seeds and fruits of sedges and salt-tolerant coastal and saltmarsh plants. Occasionally, flowers and stems are eaten. Orange-bellied Parrots are known to forage among flocks of Blue-winged Parrots. Recent records from unexpected places, including Shellharbour and Maroubra suggest that the species may be expanding their selection of habitats and foraging plant species. Birds seen in NSW in 2003 were foraging on weed species several hundred metres from the coast.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Ninox connivens	Barking Owl	V,P,3		Distribution & Ecology: Found throughout continental Australia except for the central arid regions. Occurs in a wide but sprase distribution in NSW. Inhabits Eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Flexible in habitat use. Foraging: preferentially hunts small arboreal mammals but will consume a variety of prey, with invertebrates predominant for most of the year, with birds and mammals becoming more important during breeding. Roosting: in shaded portions of tree canopies, inlcuding tall midstorey trees with dense foliage. Breeding: Begins mid-winter and spring. Nests in hollows of large, old living eucalypts. Laying during August and fledging in November. Notable Threats: secondary poisoning from rodenticide, loss of nesting hollows	**Low:** Not detected during current survey. Two new records of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Ninox strenua	Powerful Owl	V,P,3		Distribution & Ecology: Endemic to eastern and south-eastern Australia. Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest and requires large tracts of forest or woodland habitat but can occur in fragmented landscapes. Foraging: medium arboreal mammals in open or closed sclerophyll forest or woodlands Roosts: by day in dense vegetation Breeding: late autumn to mid-winter in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old Behaviour: monogamous and mate for life Relevant threats: Predation of fledglings by foxes, dogs and cats, and secondary poisoning	**Moderate:** Not detected during current survey. There are 173 recorded occurrences within 5km of the site with 159 of these being recent records (within the last 10years). No habitat associations present on site.
Numenius madagascariensis	Eastern Curlew	P	CE,C,J,K	Distribution & Ecology: Within Australia, the Eastern Curlew has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. They are rarely recorded inland. It is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes in saltworks and sewage farm. Foraging: mainly on soft sheltered intertidal sandflats or mudflats, open and without vegetation or covered with seagrass, often near mangroves, on saltflats and in saltmarsh, rockpools and among rubble on coral reefs, and on ocean beaches near the tideline. Diet includes crustaceans, small molluscs and insects. Roosting: on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. It occasionally roosts on reef-flats, in the shallow water of lagoons and other near-coastal wetlands. They are also recorded roosting in trees and on the upright stakes of oyster-racks. Breeding: Russia and north- eastern China, in early May to	**Extremely Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on site

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				late June. Arrives back in Australia in August. Notable threats: wetland degradation	
Numenius phaeopus	Whimbrel	P	C,J,K	Distribution & Ecology: a regular migrant to Australia and New Zealand, with a primarily coastal distribution. It is found in all states but is more common in the north. Found along almost the entire coast of Queensland and NSW. Often found on intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with magroves, but also open, unvegetated mud flats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms. Foraging: generally on intertidal mudflats, along the muddy banks of estuaries and in coastal lagoons, eithe rin open unvegetated areas or among mangroves. Their diet includes annelids, crustaceans, berries, molluscs, arachnids, insect and reptiles, and very occasionally, vertebraes such as small fish and nestlings of other species. Roosting: They regularly roost in mangroves and other structures flooded at high tide. They often roost in the branches of mangroves around mudflats and in estuaries and occasionally in tall coastal trees. They have also been observed to roost on the ground (sometimes under mangroves or in shallow water), on muddy, sandy or rocky beaches; rocky islets and coral cays. Nesting: in a depression in the ground filled with fragments of vegetation, usually in an exposed location. Breeding: In north and west Alaska, from May to mid-June.	**Extremely Low:** Not detected during current survey. Two old records of species occurrence found within 5km of the site. No habitat associations present on site
Onychoprion fuscata	Sooty Tern	V,P		Distribution & Ecology: pelagic, found over tropical and sub-tropical seas and on associated islands and cays around Northern Australia. In NSW only known to breed at Lord Howe Island. Occasionally seen along coastal NSW, especially after cyclones. Large flocks can be seen soaring, skimming and dipping but seldom plunging in off shore waters. Foraging: by picking fish from the surface in marine environments, often in large flocks. Breeding: Breeds in large colonies on rocky or coral islands, laying one to three eggs. Roosting: sand or coral scrapes on offshore islands and cays including Lord Howe and Norfolk Islands.	**Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Pachyptila turtur subantarctica	Southern Fairy Prion		V	Fairy prions breed on the Poor Knights Islands, islands in the outer Marlborough Sounds (especially Stephens Island, Trio Islands and The Brothers), rock stacks and islets off the West Coast (including the Open Bay Islands), Motunau Island, rock stacks off Banks Peninsula, cliff ledges on Otago Peninsula and nearby Green Island, many islands in Foveaux Strait and around Stewart Island, Mangere Island and at least six smaller islands in the Chatham Islands, the Snares Islands, Antipodes Island and Macquarie Island. They may also breed on islets off Campbell Island. Elsewhere, fairy prions breed on islands off Victoria and Tasmania, Australia, and on islands in the Kerguelen, Crozet, St Paul, Prince Edward, Marion, South Georgia and Falkland archipelagos. Vagrants have been found at the Kermadec Islands, Papua New Guinea, South America and South Africa. They are most often seen over the open sea near breeding colonies, and rarely enter sheltered coastal waters. Fairy prions mainly eat small pelagic crustaceans, along with small fish and squid. The small krill species Nyctiphanes australis is by far the predominant species eaten in New Zealand, followed by pelagic amphipods and copepods.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Pandion cristatus	Eastern Osprey	V,P,3		Distribution & Ecology: right around the Australian coastline, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs. Uncommon to rare or absent from closely settled parts of south-eastern Australia. There are a handful of records from inland areas.They favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Foraging: Feed on fish over clear, open water. Breeding: from July to September in NSW. Nesting: Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. .	**Observed:** This species was observed during the site survey.
Perameles nasuta	Long-nosed Bandicoot, North Head	E2,P		Distribution & Ecology: Restricted to North Head in the Manly LGA. Essentially a solitary animal that occupies a variety of habitats on North Head. Foraging: mainly at or after dusk, digging for invertebrates, fungi and tubers. The conical holes it leaves in the soil are often seen at the interface of naturally vegetated and areas of open grass around	**High:** Not detected during current survey. There are 4878 recorded occurrences within 5km of the site with 4516 of these

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				the Quarantine Station, former Defence Lands and Saint Patrick's Estate. Shelter: during the day in a well-concealed nest based on a shallow hole lined with leaves and grass, sometimes under debris, sometimes hidden with soil and with the entrance closed for greater concealment. Breeding: Mating takes place at night and may occur throughout the year in the Sydney Region, although there is a trough in breeding activity from late autumn (April) to mid-winter (June). Has a very high reproductive capacity. Notable Threats: toxoplasmosis, urban development, road mortality, predation by cats & foxes	being recent records (within the last 10years) and the latest record from 2021. Habitat associations present on site.
Petauroides volans	Greater Glider	P	V	Distribution & Ecology: Endemic to eastern Australia. Eucalypt forests and woodlands. Favours forests with a diversity of eucalypt species. Studies suggest that the species needs at least 2-4 live den trees for every 2 ha of suitable forest habitat. Home ranges are typically relatively small with a low dispersal ability. Modelling suggests that they need native forest patches of at least 160 km² to maintain viable populations. Foraging: primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers. Shelter: rest by day in tree hollows Breeding: March to June in large tree hollows. Relatively low reproductive rate.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Petaurus australis	Yellow-bellied Glider	V,P		Distribution & Ecology: found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Foraging: Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. They extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar. Behaviour: Live in small family groups of two - six individuals and are nocturnal. Very mobile and occupy large home ranges between 20 to 85 ha to	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				encompass dispersed and seasonally variable food resources. Shelter: Den, often in family groups, in hollows of large trees.	
Petrogale penicillata	Brush-tailed Rock-wallaby	E1,P	V	Distribution & Ecology: The range of the Brush-tailed Rock-wallaby extends from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. In NSW they occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. They occupy rocky escarpments with a preference for complex structures with fissures, caves and ledges, often facing north. Shelter: Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night. Foraging: browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Breeding: throughout the year with a peak in births between February and May, especially in the southern parts of the range and at higher altitudes.	**Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. Some habitat associations present on site.
Phascolarctos cinereus	Koala	V,P	V	Distribution & Ecology: Eucalypt woodlands and forests. The only known Sydney population is in Campbelltown LGA. Behaviour: Inactive for most of the day, feeding and moving mostly at night. Foraging: Needs a large number of preferred food tree species, this differs depending on the region.	**Extremely Low:** Not detected during current survey. Two old records of species occurrence found within 5km of the site. No habitat associations present on site
Phoebetria fusca	Sooty Albatross	V,P	V	The Sooty Albatross is a pelagic or oceangoing species that inhabits subantarctic and subtropical marine waters, spending the majority of its time at sea. It rarely occurs in continental shelf waters. Often small, isolated, subantarctic islands provide breeding habitat. The Sooty Albatross nests on subantarctic islands, including Prince Edward Island, Iles Crozet, Iles des Apotres and Iles Kerguelen. Nests are located amongst vegetation on steep slopes or cliffs and consist of a mound of mud and plant matter, lined with grass	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Pluvialis fulva	Pacific Golden Plover	P	C,J,K	Distribution & Ecology: Widespread in Australia coastal regions, though there are inland records, usually along major river systems. Most occur along the east coast, and are especially widespread along the QLD and NSW coastlines.They usually inhabit coastal habitats, though it occasionally occurs around inland wetlands. They also occur on beaches, mudflats and sandflats, in sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks. They are less often recorded in terrestrial habitats, usually wetlands. Foraging: usually on sandy or muddy shores or margins of sheltered areas such as estuaries and lagoons, though it also feeds on rocky shores, islands or reefs. They eat mainly molluscs, worms, insect larvae, spiders and crustaceans. Roosting: They usually roost near foraging areas, on sandy beaches and spits or rocky points, islets or exposed reefs, occasionally among or beneath vegetation. Breeding: June and July, on dry tundra away fron the coast, mostly in Northern Siberia, with some breeding in western parts of Alaska.	**Low:** Not detected during current survey. Four new records of species occurrence found within 5km of the site. No habitat associations present on site.
Pluvialis squatarola	Grey Plover	P	C,J,K	In non-breeding grounds in Australia, occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. Also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes. Very occasionally recorded further inland, where they occur around wetlands or salt-lakes. Foraging: on large areas of exposed mudflats and beaches of sheltered coastal shores such as inlets, estuaries and lagoons. They also occasionally feed in pasture and at the muddy margins of inland wetlands. Rosting: in sandy areas, such as on unvegetated sandbanks or sand-spits on sheltered beaches or other sheltered environments such as estuaries or lagoons.	**Moderate:** Not detected during current survey. Two new records of species occurrence found within 5km of the site. Some habitat associations present on site.
Pseudomys novaehollandiae	New Holland Mouse	P	V	The New Holland Mouse has a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Across the species' range, the total population size of mature individuals	**Low**: Not detected during current survey. No

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				estimated to be less than 10,000 individuals (Menkhorst et al., 2008). The species is known to inhabit open heathlands, open woodlands with a heathland understorey and vegetated sand dunes (Lazenby et al., 2008). The species peaks in abundance during early to mid stages of vegetation succession typically induced by fire (Fox and Mckay, 1981). It is a social animal, living predominantly in burrows shared with other individuals.	records of species occurrence found within 5km of the site. Some habitat associations present on site.
Pseudophryne australis	Red-crowned Toadlet	V,P		Distribution & Ecology: restricted distribution, confined to the Sydney Basin. Occurs from Pokolbin (north) to Nowra (south) and Mt Victoria (west). Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings. Shelter: under rocks and amongst masses of dense vegetation or thick piles of leaf litter Breeding: congregations occur in dense vegetation and debris beside ephemeral creeks and gutters. Eggs are laid in moist leaf litter. Disperses outside the breeding period. Notable Threats: reduction in water quality near urban areas, chytrid fungus.	**High:** Not detected during current survey. There are 128 recorded occurrences within 5km of the site with 111 of these being recent records (within the last 10years). Habitat associations present on site
Pterodroma leucoptera leucoptera	Gould's Petrel	V,P	E	Distribution & Ecology: The pelagic distribution is unknown, and it is seldom recorded away from its breeding island. Usually seen at sea singly or in pairs. They breed on both Cabbage Tree Island, 1.4 km offshore from Port Stephens and on nearby Boondelbah island. The range and feeding areas of non-breeding petrels are unknown. The first arrival on Cabbage Tree Island occurs from mid to late September. Principal nesting habitat is located within two gullies which are characterised by steeply, sloping rock scree with a canopy of Cabbage Tree Palms. Roosting: They nest predominantly in natural rock crevices among the rock scree and also in hollow fallen palm trunks, under mats of fallen palm fronds and in cavities among the buttresses of fig trees. They breed colonially and the nests are clumped and often less than 1 m apart. Breeding: Egg laying takes place over a six week period commencing in early November. Foraging: diet is poorly known but as a whole includes cephalods and fish.	**Extremely Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on site

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Pterodroma neglecta neglecta	Kermadec Petrel (west Pacific subspecies)	V,P	V	Ranges over subtropical and tropical waters of the South Pacific. Balls Pyramid (near Lord Howe Island) and Phillip Island (near Norfolk Island) are the only known breeding sites in Australian waters. Habitat and ecology: Marine. Breeds on islands across the South Pacific. In Australia it breeds on Ball's Pyramid and Phillip Island (near Norfolk Island). Nests in a crevice amongst rocks. Diet is squid and crustaceans. Vagrant birds occur in coastal NSW waters, particularly after storm events.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	Distribution & Ecology: Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting: generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy Breeding: Annual mating commences in January and conception occurs in April or May; a single young is born in October or November Foraging: Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km	**High:** Not detected during current survey. There are 173 recorded occurrences within 5km of the site with 152 of these being recent records (within the last 10years). Habitat associations present on site.
Ptilinopus magnificus	Wompoo Fruit-Dove	V,P		Distribution & Ecology: Occurs along the coast and coastal ranges from the Hunter River in NSW to Cape York Peninsula. It is rare south of Coffs Harbour. Three subspecies are recognised, with the most southerly in NSW and south-eastern Queensland. It used to occur in the Illawarra, though there are no recent records. Occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests. Foraging: Feeds on a diverse range of tree and vine fruits and is locally nomadic - following ripening fruit. Thought to be an effective medium to long-distance vector for seed dispersal. Feeds alone, or in loose flocks at any height in the canopy. Nesting: The nest is a typical pigeon nest - a flimsy platform of sticks on a thin branch or a palm frond, often over water, usually 3 - 10 m above the ground. Breeding: in spring and early summer; a single white egg is laid. Notable Threats: logging	**Extremely Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on site

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Ptilinopus regina	Rose-crowned Fruit-Dove	V,P		Coast and ranges of eastern NSW and Queensland, from Newcastle to Cape York. Vagrants are occasionally found further south to Victoria. Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. They are shy pigeons, not easy to see amongst the foliage, and are more often heard than seen. They feed entirely on fruit from vines, shrubs, large trees and palms, and are thought to be locally nomadic as they follow the ripening of fruits. Some populations are migratory in response to food availability - numbers in north-east NSW increase during spring and summer then decline in April or May.	**Low:** Not detected during current survey. Two new records of species occurrence found within 5km of the site. No habitat associations present on site.
Ptilinopus superbus	Superb Fruit-Dove	V,P		Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees. Behaviour: Part of the population is migratory or nomadic. There are records of single birds flying into lighted windows and lighthouses, indicating that birds travel at night. At least some of the population, particularly young birds, moves south through Sydney, especially in autumn. Breeding: September to January. Nest is a structure of fine interlocked forked twigs. Usually 5-30 metres up in rainforest and rainforest edge tree and shrub species. Male incubates the single egg by day, the female incubates at night.	**Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. No habitat associations present on site.
Rostratula australis	Australian Painted Snipe	E1,P	E	The Australian Painted Snipe is restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Habitat and ecology: Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally occurs from September to December. Incubation and care of young is all undertaken by the male only. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		Distribution & Ecology: wide-ranging across northern and eastern Australia. Roosting: singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Breeding: December to mid-March Foraging: most habitats across its very wide range, with and without trees; appears to defend an aerial territory Behaviour: Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.	**Moderate:** Not detected during current survey. One new record of species occurrence found within 5km of the site. Some habitat associations present on site.
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		Distribution & Ecology: found mainly in the gullies and river systems that drain the Great Dividing Range, from north eastern Victoria to the Atherton Tableland. It utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Does not occur at altitudes above 500 m. Roosts: usually in tree hollows, it has also been found in buildings Foraging: after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m, searching for beetles and other large slow-flying insects. Breeding: Little is known of its reproductive cycle, however a single young is born in January. Notable threats: pesticides and herbicides, habitat loss	**Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. No habitat associations present on site.
Sterna hirundo	Common Tern	P	C,J,K	Distribution & Ecology: they are marine, pelagic and coastal. A non-breeding migrant in Australia, they are recorded in all marine zones, but are commonly observed in near-coastal waters, both on ocean beaches, platforms and headlands and in sheltered waters, such as bays, harbours and estuaries. Occasionally they are recorded in coastal and near-coastal wetlands, including lagoons, rivers, lakes, swamps and saltworks. Sometimes they occur in	**Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				mangroves or saltmarsh and, in bad weather, in coastal sand-dunes or coastal embayments. Foraging: in marine environments, often close to the shore, including sheltered embayments and in the surf-zone, but also well out to sea. They also forage in near-coastal terrestrial wetlands, including estuaries, rivers and swamps. Diet is predominately small fish, crustaceans, insects and squid. Roosting: on unvegetated, intertidal sandy ocean beaches, sandy islands, shores of estuaries or lagoons, and sandbars, as well as on rocky shores, rock platforms or rocks protruding above the surface of the water. Nesting: on the ground in the open, usually on bare substrates, occasionally near vegetation or in it, or on a floating mat of vegetation. They usually nest on islands, either marine or in lakes, only sometimes on mainland beaches. Breeding: North America and Eurasia in the boreal spring-summer with a large global population and vagrants recorded widely. Notable Threats: human disturbance from recreation and tourism.	
Sternula albifrons	Little Tern	E1,P	C,J,K	Distribution & Ecology: Migrating from eastern Asia, they are found on the north, east and south-east Australian coasts, from Shark Bay in Western Australia to the Gulf of St Vincent in South Australia. In NSW, it arrives from September to November, occurring mainly north of Sydney, with smaller numbers found south to Victoria. Almost exclusively coastal, they inhabit sheltered environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches. Foraging: They forage in in shallow waters of estuaries, coastal lagoons and lakes, frequently over channels next to spits and banks or entrances, and often close to breeding colonies. They also forage along open coasts, especially around bars off the entrances to rivers and lagoons, less often at sea, and usually within 50 m of shore. Often seen feeding in flocks, foraging for small fish, crustaceans, insects, worms and molluscs by plunging in the shallow water of channels and estuaries, and in the surf on beaches, or skipping over the water surface with a swallow-like flight.	**Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				Breeding: It breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is seen until May, with only occasional birds seen in winter months. Roosting: in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands. The nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles.	
Sternula nereis nereis	Australian Fairy Tern	P	V	Within Australia, the Fairy Tern occurs along the coasts of Victoria, Tasmania, South Australia and Western Australia; occurring as far north as the Dampier Archipelago near Karratha. The subspecies has been known from New South Wales (NSW) in the past, but it is unknown if it persists there. The Fairy Tern (Australian) nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline. The bird roosts on beaches at night. The subspecies may migrate within southern Western Australia and Tasmania, where are seen less frequently during the winter months. The bird is more sedentary in the north of Western Australia, South Australia and Victoria.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Sula leucogaster	Brown Booby	P	C,J,K	The Brown Booby uses both marine and terrestrial habitat. The species occurs in, but is not restricted to, tropical waters of all major oceans, often staying close to breeding islands. The species is known to approach mainland coastlines more than other boobies and has been recorded in coastal waters, harbours and estuaries and near offshore islands but seldom flying over land. The Brown Booby utilises tropical islands, continental islands, sand cays and atolls for breeding. The Brown Booby nests on the ground in a variety of sites, from rugged rocky terrain (cliffs, steep slopes) on larger islands, to beaches, sand bards, coral rubble and guano flats on cays.	**Extremely Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on site
Thalassarche bulleri	Buller's Albatross	P	V	Buller's Albatross breed in New Zealand (Snares, Solander and Chatham Islands), but are regular visitors to Australian waters. They are frequently seen off the coast from Coffs Harbour, south to Tasmania and west to Eyre Peninsula, however, some of these birds may be the Pacific Albatross	**Extremely Low:** Not detected during current survey. One old record of species occurrence found

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				(Environment Australia 2001f). Buller's Albatross are most common off south-east Tasmania between January–April. Buller's Albatross are marine and pelagic, inhabiting subtropical and subantarctic waters of the southern Pacific Ocean. Specific habitat requirements are poorly known, but they have been observed in association with fishing boats close inshore and over waters 180–360 m deep in New Zealand (Robertson & Jenkins 1981; Secker 1969). This species does not appear to be as strongly associated with fishing boats as other albatrosses. In Australia, Buller's Albatross are seen over inshore, offshore and pelagic waters. They appear to congregate over currents where water temperature exceeds 16 °C. Breeding habitat of Buller's Albatross occurs on subtropical and subantarctic islands and rock stacks in the New Zealand region. Nests are made in a range of inland habitats including: bare substrate or fern and tussock covered cliffs, slopes or ridges; open grassy meadows; and summit plateaus under Olearia forest.	within 5km of the site. No habitat associations present on site
Thalassarche bulleri platei	Northern Buller's Albatross	P	V	The Pacific Albatross is a non-breeding visitor to Australian waters. Foraging birds are mostly limited to the Pacific Ocean and the Tasman Sea, although birds do reach the east coast of the Australian mainland. Occurrence within the Australian Fishing Zone is likely, however, the threat from longline injury is considered low. The Pacific Albatross breeds only on Chatham and Three Kings Island, New Zealand, and during this period it is also recorded in the oceanic subtropical east of New Zealand. Most birds seem to disperse outside Australasian seas during the non-breeding season. Away from the breeding grounds, they tend to range across the south Pacific Ocean north of the Antarctic Convergence, from south-east Australia to west South America. Some non-breeding birds have been sighted off the west coast of South America and it is possible that many also forage over the Louisville Ridge north-east of New Zealand. The foraging distribution of this species is poorly known, predominantly due to taxonomic confusion and the difficulty of distinguishing the Pacific Albatross and Buller's Albatross at sea.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
Thalassarche cauta	Shy Albatross	V,P	V	This species is circumpolar in distribution, occurring widely in the southern oceans. Islands off Australia and New Zealand provide breeding habitat. In Australian waters, the Shy Albatross occurs along the east coast from Stradbroke Island in Queensland along the entire south coast of the continent to Carnarvon in Western Australia. Although uncommon north of Sydney, the species is commonly recorded off southeast NSW, particularly between July and November, and has been recorded in Ben Boyd National Park. Habitat and ecology This pelagic or ocean-going species inhabits subantarctic and subtropical marine waters, spending the majority of its time at sea. While at sea, it soars on strong winds and when calm, individuals may rest on the ocean, in groups during the breeding season or as individuals at other times. Occasionally the species occurs in continental shelf waters, in bays and harbours. The species feeds on fish, crustaceans, offal and squid and may forage in mixed-species flocks. Food may be caught by seizing prey from the water's surface while swimming, by landing on top of prey, diving for prey beneath the water and by scavenging behind fishing vessels. Known breeding locations include Albatross Island off Tasmania, Auckland Island, Bounty Island and The Snares, off New Zealand, where nesting colonies of 6-500 nests occur and may contain other species such as the Australian Gannet. Located on sheltered sides of islands, on cliffs and ledges, in crevices and slopes, nests are used annually and consist of a mound of mud, bones, plant matter and rocks. Parents are territorial while nesting, having both defensive and mating displays. Breeding occurs September-December, when a single egg is laid and incubated for 72 days. Both parents feed and guard the young for approximately 5 months before they fledge and become independent.	**Extremely Low:** Not detected during current survey. Eight old record of species occurrence found within 5km of the site. No habitat associations present on site
Thalassarche eremita	Chatham Albatross	P	E	The Chatham albatross nests only on The Pyramid in the Chatham Islands. When not breeding they range in the South Pacific from Tasmania to Chile	**Extremely Low**: Not detected during current survey. No records of

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				and Peru. From April to July they will utilize the Humboldt Current and go as far north as 6°S along the South American coast.	species occurrence found within 5km of the site. No habitat associations present on site.
Thalassarche impavida	Campbell Albatross	P	V	The Campbell albatross breeds on the northern and western coastline of Campbell Island and the islet Jeanette Marie. When breeding they forage from South Island and the Chatham Rise to the Ross Sea. Juveniles and non-breeders will go only through south Australian water, the Tasman Sea, and southwestern Pacific Ocean. The Cambell albatross feeds on fish, squid, crustacea, carrion, and gelatinous organisms.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.
Thalassarche melanophris	Black-browed Albatross	V,P	V	The black-browed albatross is circumpolar in the southern oceans, and it breeds on 12 islands throughout that range. In the Pacific Ocean it breeds on Islas Ildefonso, Diego de Almagro, Islas Evangelistas, Campbell Island, Antipodes Islands, Snares Islands, and Macquarie Island. In the Indian Ocean it breeds on the Crozet Islands, Kerguelen Islands, Heard Island, and McDonald Island. The black-browed albatross feeds on fish, squid, crustaceans, carrion, and fishery discards. This species has been observed stealing food from other species. This species normally nests on steep slopes covered with tussock grass and sometimes on cliffs; however, on the Falklands it nests on flat grassland on the coast. They are an annual breeder laying one egg from between 20 September and 1 November, although the Falklands, Crozet, and Kerguelen breeders lay about three weeks earlier. Incubation is done by both sexes and lasts 68 to 71 days. After hatching, the chicks take 120 to 130 days to fledge. Juveniles will return to the colony after two to three years but only to practice courtship rituals, as they start breeding around the 10th year.	**Extremely Low:** Not detected during current survey. 19 old record of species occurrence found within 5km of the site. No habitat associations present on site
Thalassarche salvini	Salvin's Albatross	P	V	Salvin's Albatross is a non-breeding visitor to Australian waters. Salvin's Albatross breeds on Bounty, Snares and Chatham Islands, south of New Zealand, as well as on Crozet Island in the Indian Ocean. The species forages over most of the southern Pacific Ocean, where it is particularly common in the Humboldt Current, off South America. There are small numbers in the Indian	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				Ocean and sometimes in the South Atlantic Ocean. Salvin's Albatross is a marine species occurring in subantarctic and subtropical waters, reaching the tropics in the cool Humboldt Current, off South America. The sea-surface temperature preferences of Salvin's Albatross are poorly known. In the southern Indian Ocean the species has been observed over waters of 6.4–13.5 °C. Birds have been noted in shelf-waters around breeding islands and over adjacent rises. During the non-breeding season, the species occurs over continental shelves around continents. It occurs both inshore and offshore and enters harbours and bays. Salvin's Albatross is scarce in pelagic waters. Salvin's Albatross nest's on level or gently sloping ledges, summits, slopes and caves of rocky islets and stacks, usually in broken terrain with little soil and vegetation.	
Thalassarche steadi	White-capped Albatross	P	V	The White-capped Albatross is probably common off the coast of south-east Australia throughout the year. This species is similar to the Shy Albatross and can be difficult to identify, especially at sea and as a juvenile. Whilst there has been no specific study, the species has been caught on longline hooks off Tasmania. It has been observed that juveniles are rare in New Zealand waters, being more common off south-east Australia and South Africa. Breeding colonies occur on islands south of New Zealand. The White-capped Albatross is a marine species and occurs in subantarctic and subtropical waters. It reaches tropical areas associated with the cool Humboldt Current off South America (Marchant & Higgins 1990). It is unknown what sea-surface temperatures this subspecies prefers; however, in the southern Indian Ocean it has been observed in waters of 6.4–13.5 °C. The White-capped Albatross has been noted in shelf-waters around breeding islands and over adjacent rises. During the non-breeding season, birds have been observed over continental shelves around continents. The species occurs both inshore and offshore and enters harbours and bays. The species is scarce in pelagic waters. Birds gather to scavenge at commercial fishing grounds.	**Extremely Low**: Not detected during current survey. No records of species occurrence found within 5km of the site. No habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				Birds nest on slopes vegetated with tussock and succulents on Auckland Island	
Thalasseus bergii	Crested Tern	P	J	The greater crested tern occurs in tropical and warm temperate coastal parts of the Old World from South Africa around the Indian Ocean to the Pacific and Australia. The greater crested tern breeds on many islands in the Indian Ocean including Aldabra and Etoile in the Seychelles, the Chagos Archipelago, and Rodrigues. There are colonies on numerous Pacific islands, including Kiribati, Fiji, Tonga, the Society Islands and the Tuamotus. The nests are located on low-lying sandy, rocky, or coral islands, sometimes amongst stunted shrubs, often without any shelter at all.[16] When not breeding, the greater crested tern will roost or rest on open shores, less often on boats, pilings, harbour buildings and raised salt mounds in lagoons. It is rarely seen on tidal creeks or inland waters. The greater crested tern breeds in colonies, often in association with other seabirds. It is monogamous and the pair bond is maintained through the year and sometimes in consecutive breeding seasons. Fish are the main food of the greater crested tern, found to make up nearly 90% of all prey items with the remainder including cephalopods, crustaceans and insects. Unusual vertebrate prey included agamid lizards and green turtle hatchlings.	**Low:** Not detected during current survey. There are 66 recorded occurrences within 5km of the site with 17 of these being recent records (within the last 10years). No habitat associations present on site.
Thinornis cucullatus cucullatus	Hooded Plover	P	V	Its natural habitats are freshwater lakes, freshwater marshes, coastal saline lagoons, and sandy beaches. Heavy populations are found on beaches with seaweed and dunes. It is threatened by habitat loss because of its small population and limited native range. It is a non-migratory inhabitant of coastal and subcoastal Western Australia, South Australia, New South Wales, Victoria and Tasmania, and is a vagrant in Queensland. A clutch of 1–3 eggs is laid from August to March, which includes also the peak of the Austral summer tourist season in its range and it is thereby heavily impacted by human activities. The eggs are a matte beige or cream colour heavily sprinkled with dark brown and lavender markings, especially at the larger end of the egg. Pyriform in shape, they measure 37 mm × 27 mm (1.46 in × 1.06 in). Eggs hatch in about 30 days. The eastern population eats	**Extremely Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on site

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				a variety of invertebrates but little is known of the diet of the western population. Specifically it eats insects, bivalves, and sandhoppers. It is usually seen in pairs or small groups near the water. For breeding it will dig a shallow scrape in sand or gravel above high-water mark and line it with pebbles, seaweed, and other debris.	
Tringa brevipes	Grey-tailed Tattler	P	C,J,K	Distribution & Ecology: Primarily northern coastal distribution and is found in most coastal regions. In NSW the Grey-tailed Tattler is distributed along most of the coast from the Queensland border, south to Tilba Lake. It is more heavily distributed along coastal regions north of Sydney. The species is rarely recorded in Victoria, however sightings have been reported in Gippsland, and east of McLaughlans Beach. The largest populations in Victoria are located at Corner Inlet, west to Westernport and Port Phillip Bays. It has occasionally been sighted on the west coast near Killarney, Port Fairy and Discovery Bay. Often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats, especially those ringed with mangroves. Foraging: usually in shallow water, on hard intertidal substrates, such as reefs and rock platforms, in rock pools and among rocks and coral rubble, over which water may surge. It has also been recorded foraging on exposed intertidal mudflats, especially with mangroves and possibly seagrass nearby. Occasionally it forages on intertidal sandflats, around banks of seaweed or protruding rocks or lumps of coral. Breeding: Nothern Siberia, in montane taiga and the forest tundra of northern Siberia, along rivers and streams and on the stone or pebble shorelines of lakes. Roosting: in the branches of mangroves or, rarely, in dense stands of other shrubs, or on snags or driftwood. Where mangroves are not present, it roosts on rocks that are sometimes partly submerged. It is also known to roost on beaches and reefs; however, it is rarely reported roosting on bare sandy beaches or sandbanks. It occasionally roosts among beds of Samolus. Sightings also indicate it roosts on sand-dunes. It often perches on artificial structures. It is occasionally found in near-coastal saltworks and sewage ponds and once	**Moderate:** Not detected during current survey. There are 20 recorded occurrences within 5km of the site with two of these being recent records (within the last 10years) . Habitat associations present on site.

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				recorded at a bore-drain. It may roost on or feed among oyster-racks and other artificial structures, such as seawalls, rocky causeways and boats.	
Tringa nebularia	Common Greenshank	P	C,J,K	Distribution & Ecology: does not breed in Australia, however, the species occurs in all types of wetlands and has the widest distribution of any shorebird in Australia. In NSW the species has been recorded in most coastal regions, and is widespread west of the Dividing Range. Found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. Foraging: The species is known to forage at edges of wetlands, in soft mud on mudflats, in channels, or in shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as sedges or saltmarsh. It has been recorded eating molluscs, crustaceans, insects, and occasionally fish and frogs. Roosting: roosts and loafs round wetlands, in shallow pools and puddles, or slightly elevated on rocks, sandbanks or small muddy islets. Nesting: on the ground in the open, in a shallow scrape lined with plant material. Breeding: in the Palaearctic, arriving Australia from August for the non-breeding season.	**Extremely Low:** Not detected during current survey. Two old records of species occurrence found within 5km of the site. No habitat associations present on site
Tringa stagnatilis	Marsh Sandpiper	P	C,J,K	Distribution & Ecology: found on coastal and inland wetlands throughout Australia. Resides in permanent or ephemeral wetlands of varying salinity. Breeding: from Eastern Europe to Eastern Siberia, mid April to early September. Non-breeders may not migrate. Foraging: usually in shallow water at the edge of wetlands. They probe wet mud of mudflats or feed among marshy vegetation. Carnivorous; recorded eating insects, molluscs and (internationally) crustaceans. Roosting: on tidal mudflats, near low saltmarsh, and around inland swamps.	**Extremely Low:** Not detected during current survey. One old record of species occurrence found within 5km of the site. No habitat associations present on site
Tyto novaehollandiae	Masked Owl	V,P,3		Distribution & Ecology: extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-west corner. It lives in dry eucalypt forests and woodlands from sea level to 1100 m. Foraging: often hunts along the edges of forests,	**Extremely Low:** Not detected during current survey. Two old records of species occurrence found within 5km of the site. No habitat associations present on site

Scientific Name	Common Name	BC Status	EPBC Status	Habitat Description and Ecology	Likelihood
				including roadsides. typical diet consists of tree-dwelling and ground mammals, especially rats. Nesting: in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. On the Nullabor Plain where there are no large trees, they roost in caves, sinkholes or crevices in the limestone cliffs. Nests are bare chambers lined with soil, sand or soft wood mulch. Breeding: when conditions are favourable and food plentiful. Notable Threats: secondary poisioning from rodenticide, loss of nesting hollows.	
Varanus rosenbergi	Rosenberg's Goanna	V,P		Rosenberg's Goanna occurs on the Sydney Sandstone in Wollemi National Park to the north-west of Sydney, in the Goulburn and ACT regions and near Cooma in the south. There are records from the South West Slopes near Khancoban and Tooma River. Also occurs in South Australia and Western Australia. Found in heath, open forest and woodland. Associated with termites, the mounds of which this species nests in; termite mounds are a critical habitat component. Individuals require large areas of habitat. Feeds on carrion, birds, eggs, reptiles and small mammals. Shelters in hollow logs, rock crevices and in burrows, which they may dig for themselves, or they may use other species' burrows, such as rabbit warrens. Runs along the ground when pursued (as opposed to the Lace Monitor, which climbs trees). Lays up to 14 eggs in a termite mound; the hatchlings dig themselves out of the mounds. Generally slow moving; on the tablelands likely only to be seen on the hottest days.	**Low:** Not detected during current survey. One new record of species occurrence found within 5km of the site. Some habitat associations present on site.

BC Act Status – V – Vulnerable, E1 Endangered, E4A - Critically Endangered, P – Protected, 2 – Category 2 sensitive species, 3 - Category 3 sensitive species
EPBC Act Status - CE - Critically Endangered, E – Endangered, V – Vulnerable, C – Camba, J – Jamba, K – Rokamba

Appendix H. EPBC Protected Matters Search Tool Report

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 17-Aug-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	9
Listed Threatened Species:	99
Listed Migratory Species:	64

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	39
Commonwealth Heritage Places:	8
Listed Marine Species:	81
Whales and Other Cetaceans:	16
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	5
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	15
Key Ecological Features (Marine):	None
Biologically Important Areas:	3
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
North Head - Sydney	NSW	Listed place	In buffer area only

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area	In buffer area only
Coastal Upland Swamps in the Sydney Basin Bioregion	Endangered	Community likely to occur within area	In feature area
Eastern Suburbs Banksia Scrub of the Sydney Region	Critically Endangered	Community likely to occur within area	In feature area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area	In buffer area only
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion	Endangered	Community likely to occur within area	In buffer area only
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area	In feature area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community may occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche eremita			
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
FISH			
Epinephelus daemelii			
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hippocampus whitei			
White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat known to occur within area	In feature area
Macquaria australasica			
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Prototroctes maraena](#) Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Seriolella brama](#) Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
[Thunnus maccoyii](#) Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
FROG			
[Heleioporus australiacus](#) Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Litoria aurea](#) Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Mixophyes balbus](#) Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat may occur within area	In feature area
MAMMAL			
[Balaenoptera borealis](#) Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area
[Balaenoptera physalus](#) Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Chalinolobus dwyeri](#) Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
Eubalaena australis			
Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
Isoodon obesulus obesulus			
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area	In feature area
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In feature area
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petrogale penicillata			
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Pseudomys novaehollandiae			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In feature area
OTHER			
Dendronephthya australis			
Cauliflower Soft Coral [90325]	Endangered	Species or species habitat known to occur within area	In feature area
PLANT			
Acacia bynoeana			
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Acacia terminalis subsp. terminalis MS Sunshine Wattle (Sydney region) [88882]	Endangered	Species or species habitat known to occur within area	In feature area
Allocasuarina portuensis Nielsen Park She-oak [21937]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Asterolasia elegans [56780]	Endangered	Species or species habitat may occur within area	In feature area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Darwinia biflora [14619]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat known to occur within area	In feature area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat known to occur within area	In feature area
Haloragodendron lucasii Hal [6480]	Endangered	Species or species habitat may occur within area	In buffer area only
Lasiopetalum joyceae [20311]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area	In feature area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area	In feature area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat known to occur within area	In feature area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat known to occur within area	In feature area
Prostanthera densa Villous Mintbush [12233]	Vulnerable	Species or species habitat may occur within area	In feature area
Prostanthera junonis Somersby Mintbush [64960]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prostanthera marifolia Seaforth Mintbush [7555]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area	In buffer area only
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Syzygium paniculatum](#) Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Thesium australe](#) Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Hoplocephalus bungaroides](#) Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
SHARK			
[Carcharias taurus (east coast population)](#) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In buffer area only
Rhincodon typus			
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Sphyrna lewini			
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
SNAIL			
Meridolum maryae			
Maroubra Woodland Snail, Maroubra Land Snail [89884]	Endangered	Species or species habitat known to occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus			
Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]		Species or species habitat likely to occur within area	In feature area
Calonectris leucomelas			
Streaked Shearwater [1077]		Species or species habitat known to occur within area	In feature area
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In feature area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area	In feature area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche eremita			
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Migratory Marine Species			
Balaenoptera borealis			
Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Balaenoptera edeni			
Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Dugong dugon Dugong [28]		Species or species habitat may occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area	In feature area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat likely to occur within area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In feature area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Commonwealth Trading Bank of Australia		
Commonwealth Land - Commonwealth Trading Bank of Australia [13209]	NSW	In buffer area only
Communications, Information Technology and the Arts - Australian Postal Corporation		
Commonwealth Land - Australian Postal Commission [13192]	NSW	In buffer area only
Commonwealth Land - Australian Postal Commission [13193]	NSW	In buffer area only
Commonwealth Land - Australian Postal Corporation [13214]	NSW	In buffer area only
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [13194]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [13231]	NSW	In buffer area only
Commonwealth Land - Telstra Corporation Limited [13187]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Telstra Corporation Limited [13213]	NSW	In buffer area only
Defence		
Commonwealth Land - Defence Service Homes Corporation [13211]	NSW	In buffer area only
Commonwealth Land - Defence Service Homes Corporation [13210]	NSW	In buffer area only
Commonwealth Land - Director of Defence Service Homes [13208]	NSW	In buffer area only
Defence - DEE WHY DEPOT [11095]	NSW	In buffer area only
Defence - HMAS PENGUIN [11071]	NSW	In buffer area only
Defence - HMAS WATSON [10029]	NSW	In buffer area only
Defence - TRAINING SHIP CONDAMINE [11073]	NSW	In buffer area only
Defence - TRAINING SHIP CONDAMINE [11072]	NSW	In buffer area only
Defence - Defence Housing Authority		
Commonwealth Land - Defence Housing Authority [13202]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13203]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13200]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13206]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13207]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13201]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13204]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13205]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13197]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13127]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13212]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13236]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13190]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13191]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13198]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13199]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13234]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Defence Housing Authority [13235]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13232]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13233]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13189]	NSW	In buffer area only
Commonwealth Land - Defence Housing Authority [13188]	NSW	In buffer area only
Commonwealth Land - Director of War Service Homes [13237]	NSW	In buffer area only

Commonwealth Heritage Places [Resource Information]

Name	State	Status	Buffer Status
Historic			
Barracks Group HMAS Watson	NSW	Listed place	In buffer area only
Cliff House	NSW	Listed place	In buffer area only
Defence site - Georges Heights and Middle Head	NSW	Listed place	In buffer area only
Golf Clubhouse (former)	NSW	Listed place	In buffer area only
HMAS Penguin	NSW	Listed place	In buffer area only
Military Road Framework - Defence Land	NSW	Listed place	In buffer area only
North Head Artillery Barracks	NSW	Listed place	In buffer area only
Ten Terminal Regiment Headquarters and AusAid Training Centre	NSW	Listed place	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat likely to occur within area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis gibsoni as Diomedea gibsoni			
Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora			
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans			
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi			
Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In feature area
Fregata ariel			
Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area	In feature area
Fregata minor			
Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster			
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor			
Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In feature area
[Phaethon lepturus](#) White-tailed Tropicbird [1014]		Species or species habitat known to occur within area	In feature area
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In feature area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
[Rostratula australis as Rostratula benghalensis (sensu lato)](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
[Stercorarius skua as Catharacta skua](#) Great Skua [823]		Species or species habitat may occur within area	In buffer area only
[Sternula albifrons as Sterna albifrons](#) Little Tern [82849]		Species or species habitat may occur within area	In feature area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat may occur within area overfly marine area	In feature area
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area
[Thalassarche bulleri platei as Thalassarche sp. nov.](#) Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In feature area
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area
Fish			
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area	In feature area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area	In feature area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat known to occur within area	In feature area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In feature area
Dugong dugon Dugong [28]		Species or species habitat may occur within area	In buffer area only
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]		Species or species habitat likely to occur within area	In feature area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Cabbage Tree Bay	Aquatic Reserve	NSW	In buffer area only
Long Reef	Aquatic Reserve	NSW	In buffer area only
North Head	Private Nature Reserve	NSW	In buffer area only
North Sydney Harbour	Aquatic Reserve	NSW	In buffer area only
Sydney Harbour	National Park	NSW	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Australian Institute of Police Management Facilities Upgrade	2006/2746	Controlled Action	Post-Approval	In buffer area only
Development of a Residential Care Facility, Middle Head, NSW	2014/7194	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Conservation and Adaptive Use of Quarantine Station	2002/556	Not Controlled Action	Completed	In buffer area only
Construction of a high-capacity fibre optic submarine cable	2006/2914	Not Controlled Action	Completed	In buffer area only
Demolition of Ablutions Block, Snapper Island, NSW	2018/8303	Not Controlled Action	Completed	In buffer area only
Fuel Reduction Proposal Redfield Road, East Killara	2003/1238	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Installation of Sydney-Guam Submarine Cable	2007/3848	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Japan-Guam-Australia Sunshine Coast Branch Marine Cable Route Survey (JGA) QLD	2018/8373	Not Controlled Action	Completed	In buffer area only
Rehabilitation works of the Coogee Sewer Diversion Submain - Maxwell Avenue, Mar	2004/1683	Not Controlled Action	Completed	In buffer area only
sewage treatmemt plant process and reliability renewals project	2005/2186	Not Controlled Action	Completed	In feature area
Subdivision of Precincts 3 and 12, St Patricks Estate	2004/1925	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
Japan-Guam-Australia (JGA) Fibre Optic Cable project	2016/7795	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Tasman Global Access submarine cable marine route survey, Narrabeen, NSW	2015/7442	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Breeding program for Grey Nurse Sharks	2007/3245	Referral Decision	Completed	In feature area

Biologically Important Areas			
Scientific Name	Behaviour	Presence	Buffer Status
Dolphins			
Tursiops aduncus			
Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur	In feature area
Sharks			
Carcharias taurus			
Grey Nurse Shark [64469]	Foraging	Known to occur	In feature area
Whales			
Megaptera novaeangliae			
Humpback Whale [38]	Foraging	Known to occur	In feature area

Bioregional Assessments			
SubRegion	BioRegion	Website	Buffer Status
Sydney	Sydney Basin	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of Agriculture Water and the Environment
GPO Box 858
Canberra City ACT 2601 Australia
+61 2 6274 1111

Appendix I. Assessments of Significance

BC Act Test of Significance

Under Part 7, Division 1 of the BC Act, the test of significance is to be taken into account for the purposes of determining whether a proposed activity or activity is likely to significantly affect threatened species, populations or communities, or their habitats. This test should be applied to species, populations and communities listed under the BC Act that have a high likelihood or known occurrence on site and where potential or known habitat has not been avoided and/ or indirect impacts are likely regardless of the minimisation or mitigation measures proposed. The Tests of Significance have been completed as according to the Threatened Species Test of Significance Guidelines (OEH, 2018)

No threatened flora species will be assessed under Part 7, Division 1 of the BC Act, the test of significance

As there are multiple faunal species with potential habitat onsite, for the purposes of the test of significance, species with similar habitat requirements have been assessed under the following groupings:

- Microchiropterian bats (Micro-bats)
    - Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – Vulnerable under the BC Act
    - Large-eared Pied Bat (*Chalinolobus dwyeri*) – Vulnerable under the BC Act
    - Little Bent-winged Bat (*Miniopterus australis*) – Vulnerable under the BC Act
- Diurnal Raptors
    - White-bellied Sea-Eagle (*Haliaeetus leucogaster*) – Vulnerable under the BC Act
    - Eastern Osprey (*Pandion cristatus*) – Vulnerable under the BC Act

Other Species Include:

- Eastern Pygmy-possum (*Cercartetus nanus*) – Vulnerable under the BC Act
- Long-nosed Bandicoot, North Head (*Perameles nasuta*) – Endangered Population under the BC Act
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable under the BC Act
- Red-crowned Toadlet (*Pseudophryne australis*) – Vulnerable under the BC Act

Microchiropteran bats (micro-bats): Large Bent-winged Bat (*Miniopterus orianae oceanensis*), Large-eared Pied Bat (*Chalinolobus dwyeri*), Little Bent-winged Bat (*Miniopterus australis*)

Name of threatened species or ecological community	**Large Bent-winged Bat (*Miniopterus orianae oceanensis*)** **Large-eared Pied Bat (*Chalinolobus dwyeri*)** **Little Bent-winged Bat (*Miniopterus australis*)**
Microchiropteran bats (micro-bats) species are known to exist within the entirety of the Sydney Metro area and specifically in the Northern Beaches Council LGA. In particular there are records of the following species within 5km of the site: Large Bent-winged Bat (*Miniopterus orianae oceanensis*), Large-eared Pied Bat (*Chalinolobus dwyeri*), Little Bent-winged Bat (*Miniopterus australis*). These species were not observed during the site survey. There is also suitable foraging and roosting habitat on the surrounding the site due to the site being on a headland with an exposed rock cliff face and the presence of dense heath vegetation. Habitat requirements (summary): Large Bent-winged Bat, Large-eared Pied Bat and the Little Bent-winged Bat primarily roost in caves. These three species are insectivorous and will forage for small insects above and within densely vegetated areas. Additionally any natural hollows, crevices, decorticating bark or man-made structures that occurs in this urban environment can act as potential roosting habitat for all of these species due to resource pressure and a high inter-species tolerability for roost habitat between Microchiropteran bats (DPE, 2017a, 2019a, 2020c). Each of these species has been deemed highly likely to occur on site and are all listed as Vulnerable under the BC Act. As such, a (5-Part) Test under Section 7.3 of the BC Act is required for microbats for this proposal.	
(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	
The site exhibits general foraging habitat and roosting habitat within the heath vegetation and the crevices within rock cliff face which are directly adjacent to the site. The site is most likely part of a larger foraging home range for the microbat species. The current proposal will directly impact and modify approximately 0.04ha land, with 0.03ha of heath vegetation to be cleared. It is possible that there may be a loss of some roosting habitat during and following the proposed works due to the alterations to the existing environment, specifically changes in the availability of the crevices within the exposed rock and disturbances due to increased foot traffic and during construction, and removal of this vegetation. The vegetation to be removed may provide foraging habitat for the insectivorous microbat species which forage within wooded areas. However, the roosting and foraging habitat to be removed is limited compared to that available within the surrounding area, particularly within the adjacent bushland area to the south-west of the site which contains the same vegetation type and is also situated on a headland. Therefore, the impact is unlikely to be such that a viable local population of the species is likely to be placed at risk of extinction.	
(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:	
(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	

Name of threatened species or ecological community	**Large Bent-winged Bat (*Miniopterus orianae oceanensis*)** **Large-eared Pied Bat (*Chalinolobus dwyeri*)** **Little Bent-winged Bat (*Miniopterus australis*)**
N/A	
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction	
N/A	
(c) in relation to the habitat of a threatened species or ecological community	
(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	
As discussed, the vegetation to be removed may provide foraging habitat for the insectivorous microbat species which forage within wooded areas. However, the vegetation to be removed under this proposal is small in area, relative to the adjacent bushland. However, the roosting habitat to be altered is limited compared to that available within the surrounding area, particularly directly south-west which contains further habitat. The proposal is unlikely to contribute to the decline of these microbat species within the site however, minor habitat modification or removal is expected due to this proposal. These impacts are to be mitigated using the strategies outlined within this FFIA (Mitigation measures) and largely only short-term impacts are expected due to the eventual construction of the proposed boardwalk which will provide higher quality roosting habitat in the long-term due to the partiality of microbat species for man-made structures.	
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	
No microbat habitat will become fragmented or isolated from other areas of habitat as a result of the proposal.	
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality	
As discussed above potentially foraging and roosting habitat is likely to be removed, as well as disturbance to vegetation and abiotic features in the environment due to construction works. Therefore**,** it is probable that there may be a loss of some roosting habitat during the proposed works. However, the roosting habitat to be removed is limited compared to that available within the surrounding area, particularly within the locality and to the south-west. Hereafter the 'locality' encompasses a larger area that includes more distant environmental features (i.e. receiving air and waters, mobile native biodiversity) typically bounded by a 2km radius. The vegetation to be removed may provide foraging habitat for the insectivorous microbat species which forage within wooded areas. However, the vegetation to be removed under this proposal is small in area, and not critical to the survival of these species. Higher quality habitat is adjacent to the site. The proposal is unlikely to contribute to the decline of these microbat species.	
(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)	

Name of threatened species or ecological community	**Large Bent-winged Bat (*Miniopterus orianae oceanensis*)** **Large-eared Pied Bat (*Chalinolobus dwyeri*)** **Little Bent-winged Bat (*Miniopterus australis*)**

The proposal is not located in any declared area of outstanding biodiversity value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The BC Act defines a 'key threatening process' (KTP) as a process that 'adversely affects threatened species or ecological communities' or 'could cause species or ecological communities that are not threatened to become threatened' (s 4.32). Schedule 4 of the BC Act provides a list of KTPs. Of those listed, the following will occur as part of the development and is relevant to microbats:

- Clearing of native vegetation. The destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation. This may result in habitat degradation or loss, population fragmentation and habitat disturbance facilitating the establishment of weeds.

Some foraging and roosting habitat is likely to be removed to an extent of up to 0.04ha land, with 0.03ha of heath vegetation to be removed. The vegetation to be removed may provide foraging habitat for the insectivorous microbat species which forage within wooded areas. However, the foraging habitat to be removed is of a small area and there is further foraging availability within the locality, particularly to the south-west of the site. The current proposal will not contribute significantly to these KTPs.

Conclusion

After careful consideration of the above factors and available information, the proposed activity within the site is not likely to have a "significant effect" on threatened microbat species including: Large Bent-winged Bat (*Miniopterus orianae oceanensis*), Large-eared Pied Bat (*Chalinolobus dwyeri*), Little Bent-winged Bat (*Miniopterus australis*).

The proposal:

- Will not adversely affect the lifecycle of the species;
- Will not remove, modify, or further fragment or isolate a significant area of habitat for the species, and;
- Does not significantly contribute to any KTP.

Consequently, a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report (BDAR) is not required.

Diurnal Raptors: White-bellied Sea-Eagle (*Haliaeetus leucogaster*) and Eastern Osprey (*Pandion cristatus*)

Name of threatened species or ecological community	**White-bellied Sea-Eagle (*Haliaeetus leucogaster*)** **Eastern Osprey (*Pandion cristatus*)**
The White-bellied Sea-Eagle (*Haliaeetus* leucogaster) and the Eastern Osprey (*Pandion cristatus*) are listed as Vulnerable under the *BC Act*. The Eastern Osprey was identified on site during the August 2022 survey however the White-bellied Sea-Eagle was not identified. A 5-Part Test under Section 7.3 of the BC Act is therefore required for this proposal. Habitat identified on site offered limited potential to support this species. This assessment of significance is conducted due to the large amount of species records in proximity to the site and therefore the require to rule out impacts to this species using the assessment of significance. The following is to be taken into account to determine whether a proposed activity or development is likely to significantly impact the **White-bellied Sea-Eagle and Eastern Osprey**. **Ecology** The White-bellied Sea-Eagle is known to occur around the Australian coastline, including Tasmania and well inland along rivers and wetlands of the Murray Darling Basin. Its habitat is characterised by the presence of large areas of open water including larger rivers, swamps, lakes and the sea and breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby. They feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion (DPE, 2019b)**.** The Eastern Osprey is found right around the Australian coastline, except for Victoria and Tasmania. They favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Eastern Ospreys feed on fish over clear, open waters and breed in nests that are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea (DPE, 2020a).	
(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	
The species is likely to forage within the area due to presence of suitable foraging habitat on or surrounding the site. The current proposal will directly impact and modify approximately 0.04ha land, with 0.03ha of heath vegetation to be cleared. This vegetation could be part of a larger foraging range however provides little habitat for both species. As the works are minor and preferable foraging and nesting habitat is elsewhere within the LGA, it is unlikely the proposal will adversely affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.	
(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:	
(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	
N/A	
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction	
N/A	

Name of threatened species or ecological community	White-bellied Sea-Eagle (*Haliaeetus leucogaster*) Eastern Osprey (*Pandion cristatus*)
(c) in relation to the habitat of a threatened species or ecological community	
(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	
The volume of vegetation to be removed or modified as a result of the proposed works is **with 0.03ha**. This area serves as potential foraging habitat for White-bellied Sea-eagles however it is unlikely and does not provide nesting habitat for either species. Due to the proposed works, there would be a small amount of potential foraging habitat removed and modified.	
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	
No White-bellied Sea-Eagle or Eastern Osprey habitat will become fragmented or isolated from other areas of habitat as a result of the proposal.	
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality	
The species is likely to forage within the area due to presence of suitable foraging habitat on or surrounding the site. The current proposal will directly impact and modify approximately **0.04ha land, with 0.03ha** of heath vegetation to be cleared. These patches of vegetation can serve as potential habitat for reptiles, mammals, waterbirds and could contain carrion, which are all potential feed for White-bellied Sea-eagles. This vegetation could be part of a larger foraging range however provides little habitat for both species. As the works are minor and preferable foraging and nesting habitat is elsewhere within the LGA, therefore the proposed activity is unlikely to remove, modify, fragment or isolate the species to the extent that it would threaten the long-term survival of the species in the locality.	
(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)	
The proposal is not located in any declared area of outstanding biodiversity value.	
(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process	
The BC Act defines a 'key threatening process' (KTP) as a process that 'adversely affects threatened species or ecological communities' or 'could cause species or ecological communities that are not threatened to become threatened' (s 4.32). Schedule 4 of the BC Act provides a list of KTPs. Of those listed, the following are already present or will occur as part of the proposal: • *Clearing of native vegetation*. The destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation. This may result in habitat degradation or loss, population fragmentation and habitat disturbance facilitating the establishment of weeds. The proposed activity involves the clearing and modification of approximately 0.0182ha of vegetation. Due to the low proportion of vegetation to be impacted and the preference of these species for other vegetation types, the current proposal is not likely to contribute significantly to this KTP.	
Conclusion	

Name of threatened species or ecological community	**White-bellied Sea-Eagle (*Haliaeetus leucogaster*)** **Eastern Osprey (*Pandion cristatus*)**

After careful consideration of the above factors and available information, the proposed activity within the subject site is not likely to have a "significant effect" on the threatened White-bellied Sea-eagle (***Haliaeetus leucogaster***) or the Eastern Osprey (***Pandion cristatus***)

The proposal:

- Will not adversely affect the lifecycle of the species;
- Will not remove, modify, or further fragment or isolate a significant area of habitat for the species, and;
- Does not significantly contribute to any KTP.

Consequently, a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report (BDAR) is not required.

Eastern Pygmy-possum (*Cercartetus nanus*)

Name of threatened species or ecological community	**Eastern Pygmy-possum *(Cercartetus nanus)***

The Eastern Pygmy-possum is listed as Vulnerable under the *BC Act*. The species was not identified on site during the August 2022 survey. A 5-Part Test under Section 7.3 of the *BC Act* is therefore required for this proposal. The following is to be taken into account to determine whether a proposed activity or development is likely to significantly impact Eastern Pygmy-possum. Habitat on site had limited potential to support this species and due to the fragmentation across the landscape and the species limited ability to move across the landscape it is unlikely to utilise the site or be impacted. This assessment of significance is conducted due to the large amount of species records in proximity to the site and therefore the require to rule out impacts to this species using the assessment of significance.

Ecology

Distribution & Ecology: south-eastern Australia, from southern Queensland to eastern South Australia and in Tasmania. In NSW it extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest.

Foraging: Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable. Also feeds on insects throughout the year; this feed source may be more important in habitats where flowers are less abundant such as wet forests.

Nesting: Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (Pseudocheirus peregrinus) dreys or thickets of vegetation, (e.g. grass-tree skirts); nest-building appears to be restricted to breeding females; tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks.

Breeding: Young can be born whenever food sources are available, however most births occur between late spring and early autumn.

Behaviour: Agile climbers, but can be caught on the ground in traps, pitfalls or postholes; generally nocturnal.

Name of threatened species or ecological community	Eastern Pygmy-possum *(Cercartetus nanus)*
Frequently spends time in torpor especially in winter, with body curled, ears folded and internal temperature close to the surroundings.(DPE, 2022d)	
(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	
The proposed development does not require the removal of hollow bearing trees however 0.03ha of heath vegetation is being removed as a result of this proposal. It is possible that there may be a loss of some roosting habitat during and following the proposed works due to the alterations to the existing environment, specifically disturbances due to increased foot traffic and construction works, and removal of this vegetation. The vegetation to be removed may provide foraging habitat for the insectivorous microbat species which forage within wooded areas. Due to the extensive habitat in good condition surrounding the site that offers higher quality breeding and foraging habitat for the Eastern Pygmy Possum, the removal of the vegetation is unlikely to result in an adverse impact on the life cycle of this species. Therefore, it is unlikely the proposal would adversely affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.	
(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:	
(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	
N/A	
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction	
N/A	
(c) in relation to the habitat of a threatened species or ecological community	
(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	
As discussed, the vegetation to be removed may provide foraging habitat for the Eastern Pygmy-possum which forages within wooded areas and favours heath vegetation. However, the vegetation to be removed under this proposal is small in area, relative to the adjacent bushland. The proposal is unlikely to contribute to the decline of this Pygmy-possum species within the site however, minor habitat modification or removal is expected due to this proposal. These impacts are to be mitigated using the strategies outlined within this FFIA (Mitigation measures) and largely only short-term impacts are expected due to the eventual construction of the proposed boardwalk. The proposed activity is unlikely to result in the further modification of the Eastern Pygmy Possums habitat nor result in the significant loss in the extent of the species habitat.	
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	

Name of threatened species or ecological community	Eastern Pygmy-possum *(Cercartetus nanus)*

No Eastern Pygmy-possum habitat will become fragmented or isolated from other areas of habitat as a result of the proposal.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

As discussed above potentially foraging and roosting habitat is likely to be removed, as well as disturbance to vegetation within the environment due to construction works and increased foot traffic. Therefore, it is probable that there may be a loss of some roosting habitat during the proposed works. However, the roosting habitat to be removed is limited compared to that available within the surrounding area, particularly within the locality and to the south-west.

The vegetation to be removed may provide foraging habitat for this Pygmy-possum, which forage within wooded areas and show a preference for heath vegetation. However, the vegetation to be removed under this proposal is small in area, and not critical to the survival of these species. Higher quality habitat is adjacent to the site. The proposal is unlikely to contribute to the decline of the Eastern Pygmy possum and the habitat to be remove is not considered to be critical to the long-term survival of the species.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

The proposal is not located in any declared area of outstanding biodiversity value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The BC Act defines a 'key threatening process' (KTP) as a process that 'adversely affects threatened species or ecological communities' or 'could cause species or ecological communities that are not threatened to become threatened' (s 4.32). Schedule 4 of the BC Act provides a list of KTPs. Of those listed, the following are already present or will occur as part of the proposal:

- *Clearing of native vegetation*. The destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation. This may result in habitat degradation or loss, population fragmentation and habitat disturbance facilitating the establishment of weeds.

Some foraging and roosting habitat is likely to be removed to an extent of up to 0.04ha land, with 0.03ha of vegetation to be removed. Due to the small extent of the removal and the availability of further habitat in the immediate area, the current proposal is not likely to contribute significantly to this KTP.

Conclusion

After careful consideration of the above factors and available information, the proposed activity within the subject site is not likely to have a "significant effect" on the threatened Eastern Pygmy-possum (*Cercartetus nanus).*
The proposal:

- Will not adversely affect the lifecycle of the species;
- Will not remove, modify, or further fragment or isolate a significant area of habitat for the species, and;
- Does not significantly contribute to any KTP.

Consequently, a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report (BDAR) is not required.

Long-nosed Bandicoot, North Head (*Perameles nasuta*)

Name of threatened species or ecological community	Long-nosed Bandicoot, North Head ( )
Long-nosed Bandicoot, North Head (***Perameles nasuta***) is listed as an Endangered population under the *BC Act*. The species was not identified on site during the August 2022 survey. A 5-Part Test under Section 7.3 of the BC Act is therefore required for this proposal. The following is to be taken into account to determine whether a proposed activity or development is likely to significantly impact the Long-nosed Bandicoot. **Habitat on site had limited potential to support this species and due to the fragmentation across the landscape and the species limited ability to move across the landscape it is unlikely to utilise the site or be impacted. This assessment of significance is conducted due to the large amount of species records in proximity to the site and therefore the require to rule out impacts to this species using the assessment of significance.** **Ecology** Long-nosed Bandicoot, North Head (Perameles nasuta) is restricted to North Head in the Manly Local Government Area. This species is a solitary animal that occupies a variety of habitats on North Head. Forages mainly at or after dusk, digging for invertebrates, fungi and tubers. The conical holes it leaves in the soil are often seen at the interface of naturally vegetated and areas of open grass. This species shelters during the day in a well-concealed nest based on a shallow hole lined with leaves and grass, sometimes under debris, sometimes hidden with soil and with the entrance closed for greater concealment. Mating takes place at night and may occur throughout the year in the Sydney Region, although there is a trough in breeding activity from late autumn (April) to mid-winter (June). They have a very high reproductive capacity (DPE, 2017b).	
(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	
The proposed development requires the removal of 0.03ha of heath vegetation as a result of this proposal. It is possible that there may be a loss of some roosting habitat during and following the proposed works due to the alterations to the existing environment, specifically disturbances due to increased foot traffic and construction works, and removal of this vegetation. There are potential direct and indirect impacts to the species as the result of the proposed works. Direct impacts include the loss of potential foraging and shelter habitat with indirect impacts including alteration of surface hydrology and consequential run-off into surrounding habitat, and increased edge effects which may result in potentially increasing weed incursion within areas of habitat for the species. Whilst the proposed works hold these potential impacts, no evidence of this Bandicoot was found within the area outlined for clearing and the site is part of a larger patch of similar vegetation which contains foraging and shelter habitat throughout. Therefore, it is unlikely the proposal will adversely affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.	
(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:	
(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	
N/A	

Name of threatened species or ecological community	Long-nosed Bandicoot, North Head ( )
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction	
N/A	
(c) in relation to the habitat of a threatened species or ecological community	
(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	
Approximately 0.0182ha of potential foraging and shelter habitat is likely to be removed or modified as a result of the proposed development or activity. These impacts are to be mitigated using the strategies outlined within this FFIA (Mitigation measures) and largely only short-term impacts are expected. Due to the proposed works, there would be a small amount of potential habitat removed and modified.	
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	
No Long-nosed Bandicoot habitat will become fragmented or isolated from other areas of habitat as a result of the proposal.	
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality	
As discussed above potentially foraging and roosting habitat is likely to be removed, as well as disturbance to vegetation within the environment due to construction works and increased foot traffic. However, the habitat to be removed is limited compared to that available within the surrounding area, particularly within the locality and to the south-west. The habitat to be removed makes up a very small portion of available habitat within the locality which will remain unaffected. Therefore, the proposed activity is unlikely to remove, modify, fragment or isolate the species to the extent that it would threaten the long-term survival of the species in the locality.	
(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)	
The proposal is not located in any declared area of outstanding biodiversity value.	
(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process	
The BC Act defines a 'key threatening process' (KTP) as a process that 'adversely affects threatened species or ecological communities' or 'could cause species or ecological communities that are not threatened to become threatened' (s 4.32). Schedule 4 of the BC Act provides a list of KTPs. Of those listed, the following are already present or will occur as part of the proposal: • *Clearing of native vegetation*. The destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation. This may result in habitat degradation or loss, population fragmentation and habitat disturbance facilitating the establishment of weeds. Some foraging and roosting habitat is likely to be removed to an extent of up to 0.0367ha of land will be modified, with up to 0.0182ha of heath vegetation to be removed. Due to the small extent of the removal and the availability of further habitat in the immediate area, the current proposal is not likely to contribute significantly to this KTP.	

Name of threatened species or ecological community	Long-nosed Bandicoot, North Head ( )
Conclusion	
After careful consideration of the above factors and available information, the proposed activity within the subject site is not likely to have a “significant effect” on the threatened Long-nosed Bandicoot, North Head (*Perameles nasuta*) The proposal: • Will not adversely affect the lifecycle of the species; • Will not remove, modify, or further fragment or isolate a significant area of habitat for the species, and; • Does not significantly contribute to any KTP. Consequently, a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report (BDAR) is not required.	

Grey-headed Flying Fox (*Pteropus poliocephalus*)

Name of threatened species or ecological community	Grey-headed Flying-fox (Pteropus poliocephalus)
A Grey-headed Flying-fox (GHFF) (*Pteropus poliocephalus*) camp is located approximately 3.4km to the south-west-west of the site in Balgowlah along Burnt Bridge Creek (DCCEEW, 2022) . This species is listed as vulnerable under the *BC Act*. The species was not identified on site during the August 2022 survey. A 5-Part Test under Section 7.3 of the BC Act is therefore required for this proposal. The following is to be taken into account to determine whether a proposed activity or development is likely to significantly impact the Grey-headed Flying-fox. Habitat on site had limited potential to support this species. This assessment of significance is conducted due to the large amount of species records in proximity to the site and therefore the require to rule out impacts to this species using the assessment of significance**.** **Ecology**: Grey-headed Flying-foxes are generally found within 200km of the eastern coast of Australia. Occurring typically in subtropical and temperate rainforests, tall sclerophyll forests and woodland, heaths and swamps as well as urban gardens and cultivated fruit crops. They feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Site fidelity to camps is high and they exist up to 20km away from a regular food source (DPE, 2020b).	
(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	
The site does not contain a known roosting colony. The species is likely to forage within the area due to presence of suitable foraging habitat on site including numerous Melaleuca and Banksia species. The current proposal will directly impact and modify approximately **0.04ha land affected, with 0.03ha** of vegetation to be cleared. It is possible that there may be a loss of some foraging habitat during and following the proposed works due to the alterations to the existing environment, specifically disturbances due to increased foot traffic and construction works, and removal of this vegetation. There are potential direct and indirect impacts to the species as the result of the proposed works. Direct impacts include the loss of potential foraging and habitat, and increased edge effects which may result in potentially increasing weed incursion within areas of habitat for the species. Whilst the proposed works hold these potential impacts, the site is part of a larger patch of similar vegetation which contains foraging habitat throughout. Therefore, it is unlikely the proposal will adversely affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	
(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:	
(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	
N/A	
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction	
N/A	
(c) in relation to the habitat of a threatened species or ecological community	

Name of threatened species or ecological community	Grey-headed Flying-fox (Pteropus poliocephalus)
(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	
Approximately 0.**03ha** of potential foraging habitat is likely to be removed or modified as a result of the proposed development or activity. These impacts are to be mitigated using the strategies outlined within this FFIA (Mitigation measures) and largely only short-term impacts are expected. Due to the proposed works, there would be a small amount of potential habitat removed and modified.	
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	
No GHFF habitat will become fragmented or isolated from other areas of habitat as a result of the proposal.	
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality	
As discussed above potentially foraging habitat is likely to be removed, as well as disturbance to vegetation within the environment due to construction works and increased foot traffic. However, the habitat to be removed is minor compared to that available within the surrounding area, particularly within the locality and to the south-west. The habitat to be removed makes up a very small portion of available habitat within the locality which will remain unaffected. Therefore, the proposed activity is unlikely to remove, modify, fragment or isolate the species to the extent that it would threaten the long-term survival of the species in the locality.	
(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)	
The proposal is not located in any declared area of outstanding biodiversity value.	
(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process	
The BC Act defines a 'key threatening process' (KTP) as a process that 'adversely affects threatened species or ecological communities' or 'could cause species or ecological communities that are not threatened to become threatened' (s 4.32). Schedule 4 of the BC Act provides a list of KTPs. Of those listed, the following will occur as part of the development and is relevant to the GHFF: • Clearing of native vegetation. The destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation. This may result in habitat degradation or loss, population fragmentation and habitat disturbance facilitating the establishment of weeds. Some foraging and roosting habitat is likely to be removed to an extent of up to 0.0367ha of land will be modified, with up to 0.0182ha of heath vegetation to be removed. Due to the small extent of the removal and the availability of further habitat in the immediate area, the current proposal is not likely to contribute significantly to this KTP.	
Conclusion	
After careful consideration of the above factors and available information, the proposed activity within the subject site is not likely to have a "significant effect" on the threatened Grey-headed Flying-Fox (*Pteropus poliocephalus*) The proposal:	

Name of threatened species or ecological community	Grey-headed Flying-fox (Pteropus poliocephalus)

- Will not adversely affect the lifecycle of the species;
- Will not remove, modify, or further fragment or isolate a significant area of habitat for the species, and;
- Does not significantly contribute to any KTP.

Consequently, a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report (BDAR) is not required.

Red-crowned Toadlet (*Pseudophryne australis*)

Name of threatened species or ecological community	Red-crowned Toadlet (*Pseudophryne australis*)

Red-crowned Toadlet (*Pseudophryne* australis) is listed as Vulnerable under the *BC Act*. This species was not identified on site during the August 2022 survey. A 5-Part Test under Section 7.3 of the *BC Act* is therefore required for this proposal. The following is to be taken into account to determine whether a proposed activity or development is likely to significantly impact Red-crowned Toadlet. Habitat on site had potential to support this species through the presence of heath vegetation, sandstone cropping'**s** and soaks. This assessment of significance is conducted due to the large amount of species records in proximity to the site and therefore the require to rule out impacts to this species using the assessment of significance**.**

Ecology

The Red-crowned Toadlet has a restricted distribution. It is confined to the Sydney Basin bordered by Pokolbin, Nowra and Mt Victoria. They occur in open forests, mostly on Hawkesbury and Narrabeen sandstones. They inhabit periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings. They shelter under rocks and amongst masses of dense vegetation or thick piles of leaf litter. Eggs are laid in moist leaf litter, from where they are washed by heavy rain. Red-crowned Toadlets are a localised species that appear to be restricted to the immediate vicinity of suitable breeding habitat. They are found commonly in small colonies scattered along ridges near breeding sites. Due to this, a small localised disturbance may have a significant impact on a local population if it occurs on a favoured breeding or refuge site (DPE, 2017c).

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

The majority of the area to be impacted by the works occur within dense heath vegetation and earth works may also occur in the creation of the boardwalk. There will also be construction works which will take place on the sandstone outcrops which may provide suitable habitat for the species.

Direct impacts include the loss of potential shelter and foraging habitat with indirect impacts including alteration of surface hydrology and consequential run-off into surrounding habitat and increasing edge effect which may result in increasing weed incursion within potential habitat for the species. These could have impacts on Red-crowned Toadlets if there are localised populations using these areas. Localised populations may be impacted by some of this work but breeding sites are unlikely to be impacted. All works would be localised and minor. With the correct mitigation measures in place, it is unlikely the proposal will adversely affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Name of threatened species or ecological community	Red-crowned Toadlet (*Pseudophryne australis*)
(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:	
(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	
N/A	
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction	
N/A	
(c) in relation to the habitat of a threatened species or ecological community	
(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	
Approximately 0.03ha of potential foraging and shelter habitat is likely to be removed or modified as a result of the proposed development or activity. No breeding habitat is likely to be significantly impacted by these works but altered surface hydrology could have indirect impacts in the flow of water within the site. Whilst the proposed works hold these potential impacts, the site is part of a larger patch of similar vegetation which contains foraging habitat throughout. Therefore, it is unlikely the proposal will adversely affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	
No Red-crowned Toadlet habitat will become fragmented or isolated from other areas of habitat as a result of the proposal.	
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality	
As discussed above potentially foraging habitat is likely to be removed, as well as disturbance to vegetation within the environment due to construction works and increased foot traffic. However, the habitat to be removed is limited compared to that available within the surrounding area, particularly within the locality and to the south-west. The habitat to be removed makes up a very small portion of available habitat within the locality which will remain unaffected. Therefore, the proposed activity is unlikely to remove, modify, fragment or isolate the species to the extent that it would threaten the long-term survival of the species in the locality.	
(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)	
The proposal is not located in any declared area of outstanding biodiversity value.	
(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process	
The BC Act defines a 'key threatening process' (KTP) as a process that 'adversely affects threatened species or ecological communities' or 'could cause species or ecological communities that are not	

Name of threatened species or ecological community	Red-crowned Toadlet (*Pseudophryne australis*)

threatened to become threatened' (s 4.32). Schedule 4 of the BC Act provides a list of KTPs. Of those listed, the following are already present or will occur as part of the proposal:

- *Clearing of native vegetation*. The destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation. This may result in habitat degradation or loss, population fragmentation and habitat disturbance facilitating the establishment of weeds.

Some foraging and roosting habitat is likely to be removed to an extent of up to 0.0367ha of land will be modified, with up to 0.0182ha of heath vegetation to be removed. Due to the small extent of the removal and the availability of further habitat in the immediate area, the current proposal is not likely to contribute significantly to this KTP.

Conclusion

After careful consideration of the above factors and available information, the proposed activity within the subject site is not likely to have a "significant effect" on the threatened **Red-crowned Toadlet (*Pseudophryne australis*)**r

The proposal:

- Will not adversely affect the lifecycle of the species;
- Will not remove, modify, or further fragment or isolate a significant area of habitat for the species, and;
- Does not significantly contribute to any KTP.

Consequently, a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report (BDAR) is not required.

7.1 EPBC Act Assessment of Significant Impact Criteria

Under Part 3 of the EPBC Act, assessment is required for actions that may impact on Matters of National Environmental Significance (MNES) or for actions proposed to be carried out upon Commonwealth Land. This self-assessment is applied to MNES listed under the EPBC Act that have a high likelihood of occurrence or known occurrence on site. Two MNES listed under the EPBC Act that have a high likelihood of occurrence or known occurrence on or in proximity to site are:

- Large-eared Pied Bat (*Chalinolobus dwyeri*) –Vulnerable under the EPBC Act
- Grey-headed Flying-fox (*Pteropus poliocephalus*) –Vulnerable under the EPBC Act

Grey-headed Flying-fox (*Pteropus poliocephalus*)

Vulnerable Species	**Grey-headed Flying-fox (*Pteropus poliocephalus*)**
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population	
The site does not contain a known roosting colony. The species is likely to forage within the area due to presence of suitable foraging habitat on site including numerous Melaleuca and Banksia species. The current proposal will directly impact and modify approximately 0.04ha land affected, with 0.03ha of vegetation to be cleared . It is possible that there may be a loss of some foraging habitat during and following the proposed works due to the alterations to the existing environment, specifically disturbances due to increased foot traffic and construction works, and removal of this vegetation. Whilst the proposed works hold these potential impacts, the site is part of a larger patch of similar vegetation which contains foraging habitat throughout. Therefore, it is unlikely the proposal will adversely affect the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction The nearest Flying-Fox camp is located approximately 3.4km to the south-west-west of the site in Balgowlah along Burnt Bridge Creek and the species is known to travel up to 50km away from a roost site to forage (DCCEEW, 2022; DPE, 2020b). The works would not directly impact the nearby camp, the minor nature of works would not have more than a negligible impact on local feeding resources. Although these impacts are likely to occur, ample shelter and foraging habitat will remain. Therefore, it is unlikely that the proposed works will bring about a long-term decrease in the size of a population	
Reduce the area of occupancy of the species	
In total, the proposed works involve the removal of 0.03ha of vegetation. The habitat features that will be removed are abundant in the adjacent vegetation and will not impact the overall distribution of the species within the area. Therefore, the proposed works will not reduce the area of occupancy of Grey-headed Flying-foxes.	
Fragment an existing population into two or more populations	
The species is likely to forage within the area due to presence of suitable foraging habitat on site including numerous Melaleuca and Banksia species. The current proposal will directly impact and modify approximately 0.04ha land affected, with 0.03ha of vegetation to be cleared. Edge effects is likely to increase where the vegetation is cleared but overall, no further fragmentation or isolation from other areas of habitat will result due to the proposed works. Due to the mobile nature of the species, the works would not fragment the population.	

Vulnerable Species	Grey-headed Flying-fox (*Pteropus poliocephalus*)
Adversely affect habitat critical to the survival of a species	
The habitat affected by the proposed works would be impacted directly through removal of vegetation and indirectly through an incursion of edge effects. Some of the vegetation to be removed includes feed trees including *Banksia* and *Melaleuca* species. Despite this, the habitat that would be removed by the proposal is connected to surrounding good quality vegetation. Therefore, the proposed works would not affect habitat critical to the survival of the species.	
Disrupt the breeding cycle of a population	
Grey-headed Flying Foxes have a high fidelity to roosting camps where breeding occurs in January with a single young born in October or November. Works may occur around the time that young are born but it is unlikely that this will occur on site. Further, a number of known roost sites are located within 50km of site where breeding is likely to occur. Therefore, the proposed works will not disrupt the breeding cycle of a population.	
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	
Approximately 0.03ha of potential foraging habitat is likely to be removed or modified as a result of the proposed development or activity. These impacts are to be mitigated using the strategies outlined within this FFIA (Mitigation measures) and largely only short-term impacts are expected**.** Therefore the works will not alter any habitat to the extent that the species is likely to decline.	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	
There are numerous invasive species on site. The removal of vegetation will incur some edge effects and degradation of the vegetation potentially increasing weed incursion. These impacts are to be mitigated using the strategies outlined within this FFIA (Mitigation measures) and largely short-term impacts are expected with the correct measures in place to prevent further weed incursion. This impact will not be significant.	
introduce disease that may cause the species to decline	
The proposal would require the importation of external materials and movement in and out of the site. There is the potential that disease including pathogens that may affect the species could be brought into the site via construction equipment and materials, however this may be reduced with the implementation of best practice hygiene methods.	
interfere with the recovery of the species	
The species has been assigned to the Site-managed species management stream under the Saving our Species (SoS) program. As mentioned above, the loss of habitat to be altered by the proposed works is deemed to have a negligible impact on the recovery of the species.	
Conclusion	
Under the EPBC Act an action requires approval from the Australian Government Minister for the Environment (the Minister) if the action has, would have, or is likely to have, a significant impact on a matter of national environmental significance such as the Vulnerable Grey-headed Flying-fox (*Pteropus poliocephalus*). The assessment above concludes that the proposed works would not have a significant	

Vulnerable Species	Grey-headed Flying-fox (*Pteropus poliocephalus*)
impact on this species and as such the action does not require referral to the Minister for further assessment and approval under the EPBC Act.	

Large-eared Pied Bat (*Chalinolobus dwyeri*)

Vulnerable Species	Large-eared Pied Bat (*Chalinolobus dwyeri*)
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population	
The proposal would require the removal of about 0.03ha of native heath vegetation. The removal of vegetation may indirectly impact the breeding, roosting, or rearing activities of the species as they may be roosting within the crevices on the side of the cliff-face. The works would have indirect impacts during construction and operation due to the increase of noise, vibration and dust. However, these impacts would be short term and there is additional habitat in the immediate area, less than 100m away. Due to the availability of additional habitat in the locality, it is unlikely that the proposal would have any adverse effect on the a long-term decrease in the size of a population.	
Reduce the area of occupancy of the species	
In total, there would be 0.03ha of native vegetation removed which provides suitable foraging habitat for the species. It is possible that there may also be a loss of some roosting habitat during and following the proposed works due to the alterations to the existing environment, specifically changes in the availability of the crevices within the exposed rock and disturbances due to increased foot traffic and during construction. However, the habitat lost during the proposed works is considered to be minor given the surrounding vegetation and cliff face and is expected to protect the exposed sandstone from the foot-traffic that is currently prevalent. These works are not considered likely to reduce the area of occupancy of an important population in the long-term.	
Fragment an existing population into two or more populations	
The species is likely to forage within the area due to presence of suitable dense foraging habitat on site. The current proposal will directly impact and modify approximately 0.04ha land affected, with 0.03ha of vegetation to be cleared. Edge effects is likely to increase where the vegetation is cleared but overall, no further fragmentation or isolation from other areas of habitat will result due to the proposed works. Due to the mobile nature of the species, the works would not fragment the population.	
Adversely affect habitat critical to the survival of a species	
The habitat affected by the proposed works would be impacted directly through removal of vegetation and indirectly through an incursion of edge effects. It is possible that there may also be a loss of some roosting habitat during and following the proposed works due to the alterations to the existing environment, specifically changes in the availability of the crevices within the exposed rock and disturbances due to increased foot traffic and during construction. However, the habitat lost during the proposed works is considered to be minor given the surrounding vegetation and cliff face and is expected to protect the exposed sandstone from the foot-traffic that is currently prevalent. The habitat that would be removed by the proposal is connected to surrounding vegetation with numerous habitat areas within the cliff face on this headland. Therefore, the proposed works would not affect habitat critical to the survival of the species.	

Vulnerable Species	Large-eared Pied Bat (*Chalinolobus dwyeri*)
Disrupt the breeding cycle of a population	
The proposal would require the removal of about 0.03ha of native heath vegetation. The removal of vegetation may indirectly impact the breeding, roosting, or rearing activities of the species as they may be roosting within the crevices on the side of the cliff-face. The works would have indirect impacts during construction and operation due to the increase of noise, vibration and dust. However, these impacts would be short term and there is additional habitat in the immediate area, less than 100m away. Due to the availability of additional habitat in the locality, the proposal is unlikely to disrupt the breeding cycle of a population utilising the greater subject area.	
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	
Approximately 0.03ha of potential foraging habitat is likely to be removed or modified as a result of the proposed development or activity. These impacts are to be mitigated using the strategies outlined within this FFIA (Mitigation measures) and largely only short-term impacts are expected**.** Therefore the works will not alter any habitat to the extent that the species is likely to decline.	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	
There are numerous invasive species on site. The removal of vegetation will incur some edge effects and degradation of the vegetation potentially increasing weed incursion. These impacts are to be mitigated using the strategies outlined within this FFIA (Mitigation measures) and largely only short-term impacts are expected with the correct measures in place to prevent further weed incursion. This impact will not be significant.	
introduce disease that may cause the species to decline	
The construction works may facilitate seed dispersal of weed species through increased traffic, however hygiene protocols would be taken during the construction process to mitigate this.	
interfere with the recovery of the species	
The National Recovery Plan for the Large-eared Pied Bat identifies multiple threats to the recovery of the species (DAWE 2011). One key threat is the removal of vegetation within the immediate proximity of maternity roosts and overhanging sandstone escarpments. Under this proposal, minor vegetation removal is expected with indirect impacts to potential breeding habitat. However, these impacts would be minor, short term and there is additional habitat in the immediate area, less than 100m away. Therefore, the proposal does not contribute to any threatening processes associated with the decline of the species and is considered to not interfere with the recovery of the species.	
Conclusion	
Under the EPBC Act an action requires approval from the Australian Government Minister for the Environment, Water, Heritage and the Arts (the Minister) if the action has, would have, or is likely to have, a significant impact on a matter of national environmental significance such as the Large-eared Pied Bat. The assessment above concludes that the proposed works would not have a significant impact on Large-eared Pied Bat and as such the action does not require referral to the Minister for further assessment and approval under the EPBC Act.	

Appendix J. Phytophthora Hygiene Protocols

Table J-1. Phytophthora Hygiene Protocols

Task	Action
Timing	When possible/practical, the development should be completed in dry soil conditions and postponed following significant rainfall. Working in dry soil conditions will reduce the need for cleaning vehicles and equipment. If it is necessary to work in wet or damp areas then greater attention will need to be spent on vehicle and equipment cleaning.
Staff	Contractors and staff involved in the development are to be made aware that fungus has / has not been recorded on site, and provided with information regarding management protocols and its threat to native vegetation.
Drainage and Water	Alterations to drainage that may result in the spread of *Phytophthora* into new areas are to be avoided as highest priority. Water used during construction should be minimised. When water is necessary, it should be from a reticulated mains system, bore supply or sterilised source. Surface water collected from infected areas should not be used. Water draining from the site should not to enter bushland areas. The use of water for dust suppression should be kept to a minimum.
Landscaping and Bush Regeneration	Plants used in landscaping should be purchased from a nursery with accreditation from the Nursery Industry Association, or from a nursery with excellent hygiene conditions. Species selected for landscaping should preferably be resistant to *Phytophthora cinnamomi*. Any gravel/sand/topsoil to be bought onto site should be purchased from a Nursery Industry Association accredited supplier, or should be certified (through testing) to be free of *Phytophthora cinnamomi*. Any infected soil/sand/gravel/vegetation moved on the site, or removed from the site should be stored at in area that is also infected with *Phytophthora cinnamomi*, or a site where the pathogen will not have any impact. Storage of gravel/sand/topsoil on site should preferably be on a dry well drained surface. Construction materials such as pipes, rocks, timber, bricks etc, should be free of mud and soil when arriving at the site. Staff should not enter infected areas unless necessary, movement within these areas should be kept to a minimum.
Vehicles and Machinery	All machinery, vehicles and equipment should arrive at the site free of uncontained mud and soil, particularly on tyres, mudflaps and the underbody. Vehicles and machinery exiting the site to be free of all uncontained mud and soil, particularly on the tyres, mudflaps and the underbody. Minimise the amount of water used. Try to remove soil and mud when it is dry (a stiff brush or stick maybe useful). Cleaning will be easier and more effective if it is completed at a depot or a permanent/designated cleaning area (it is acceptable for vehicles and machinery to be taken to a cleaning facility on sealed roads). If cleaning is to occur in the field select a site with a hard, well-drained surface (eg. a road) that is well away from remnant vegetation. If possible, wash down in an area that is close to the area you have been operating in. Wash down on ramps if possible. Do not allow mud and wash-down effluent to drain into bushland. Do not drive through wash-down effluent.
Footwear and Tools	Try to remove as much mud and soil as possible when it is dry with a stiff brush or stick. Minimise the amount of water used to initially clean footwear and tools. Footwear and tools should be scrubbed with a sterile solution (see below). All mud and soil should be collected (including in liquid) and removed in a bag or bucket. This material is to be disposed of at a site that is already infected with Cinnamon Fungus, or a site that contains no bushland.
Sterilising	Equipment can be sterilised by soaking in a disinfectant such as bleach (containing sodium hypochlorite). The bleach should be diluted (1 part bleach to 10 parts water), soak the tools for a few minutes, and then rinse. Alternatively methylated spirits can also be used for sterilising small hand tools and footwear in the field. A spray

	bottle containing methylated spirits can be used to cover all surfaces, allowing time for it to soak into all soil material (a couple of minutes is sufficient). A sterile water solution suitable for spraying down vehicles and machinery can be made by mixing 6mL of sodium hypochlorite (eg. pool chlorine or bleach) to every 10L of water.